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ABSTRACT

This report used national data to assess the participation and degree completion status of Blacks and Hispanics in U.S. graduate and professional schools. Objectives of the report were: (1) to examine national data on the graduate and professional school enrollment and degree attainment of race and sex groups in various major fields of study; (2) to identify and discuss factors that are associated with and/or influence the access, matriculation, and degree completion status of Blacks and Hispanics in U.S. graduate and professional schools; and (3) to present recommendations for increasing the higher educational access and success of Blacks and Hispanics. The major finding in this report was that Blacks and Hispanics have made minimal progress in graduate and professional school access and degree attainment in the present decade. More specifically, the data revealed that Blacks and Hispanics remained underrepresented in U.S. graduate and professional schools relative to their proportional representation among baccalaureate-degree recipients. Among the policy recommendations presented are to improve elementary and secondary education for minorities, increase their financial aid for attending college, and improve higher education recruitment and selection practices. Contains 91 references. (GLR)

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The Access and Success of Blacks and Hispanics in U.S. Graduate and Professional Education

A Working Paper
Prepared by
Gail E. Thomas

for

Office of Scientific and Engineering Personnel
NATIONAL RESEARCH COUNCIL

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The research conducted by Gail E. Thomas, as a National Research Council Fellow associated with the Office of Scientific and Engineering Personnel during 1984 and 1985, came from funding by the Andrew W. Mellon Foundation with additional support from the Ford Foundation under Grant No. 855-0089. Opinions, findings, conclusions, or recommendations expressed in this publication are those of the author and do not necessarily reflect the views of the sponsors.

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FOREWORD

Given the current lack of progress by minorities in increasing their representation in our nation's research and academic establishments, the subject of this report is most appropriate and timely. Gail E. Thomas, its author, was awarded a National Research Council fellowship to pursue research on the access and success of Blacks and Hispanics in U.S. graduate and professional schools under the auspices of the National Research Council's Office of Scientific and Engineering Personnel. On leave from the Center for Social Organization of Schools, the Johns Hopkins University, Dr. Thomas brought to this report a considerable amount of expertise and research creativity. Her scholarly work has been recognized by a variety of organizations interested in this topic and include not only the Research Council and the Ford Foundation, but also the Russell Sage Foundation, the Johns Hopkins University, the Southern Education Foundation, the Spencer Foundation, and the National Science Foundation.

This report is unusual in that it was authored by an individual, not by an official study committee whose members were selected by the Research Council for their expertise in various fields. While the views expressed here do not necessarily reflect those of the Research Council and its Office of Scientific and Engineering Personnel, the report does reflect Dr. Thomas' scholarly research and the conclusions and recommendations drawn from it.

Alan Fechter
Executive Director
Office of Scientific
and Engineering Personnel

PREFACE

In conducting this assessment of the access and success of Blacks and Hispanics in U.S. graduate and professional education, I have benefited from the support and advice of many individuals and organizations. The report was completed during my tenure as a National Research Council Fellow, working with the Research Council's Office of Scientific and Engineering Personnel. Special thanks go to Susan W. Sherman, coordinator of that fellowship program, and to Alan Fechter, OSEP's executive director, for providing the initial opportunity to pursue this research topic, which has intrigued me for some time. Financial support was provided by the Andrew W. Mellon Foundation, which funded the fellowship program, and by the Ford Foundation, without whose combined support the project could not have been undertaken. I greatly appreciate the enthusiasm and the personal commitment of Sheila Biddle, program director at Ford, to this report. I also want to thank Linda S. Dix, OSEP's administrative officer and editor, for providing expertise on procedures and policies of the Research Council and Agnes Israelsen for her dedication and secretarial skills.

Finally, I thank my colleagues for their time and invaluable review comments, which further strengthened this document.

Gail E. Thomas

ABSTRACT

This report employs national data to assess the participation and degree completion status of Blacks and Hispanics in U.S. graduate and professional schools. Three objectives are pursued in this regard. First, national data on the graduate and professional school enrollment and degree attainment of race and sex groups in various major fields of study are examined. Second, this report identifies and discusses factors that are associated with and/or that influence the access, matriculation, and degree completion status of Blacks and Hispanics in U.S. graduate and professional schools. Third, recommendations are made for increasing the higher educational access and success of Blacks and Hispanics.

The primary data source used in this report is the U.S. Office of Civil Rights (OCR) Higher Education Institutional Enrollment Survey. Additional data employed are from the National Center of Education Statistics (NCES) undergraduate enrollment survey, the Graduate Record Examination, the American Association of Medical Colleges, and the Law School Admissions Council. Data from OCR and NCES are used to report trends in student undergraduate, graduate, and professional school enrollment and degree completion. The latter data sources are used to present recent trends in students' standardized test performance.

The major finding in this report is that Blacks and Hispanics have made minimal progress in graduate and professional school access and degree attainment in the present decade. More specifically, the data revealed that Blacks and Hispanics remained underrepresented in U.S. graduate and professional schools relative to their proportional representation among baccalaureate-degree recipients. In contrast, Whites, Asian Americans, and non-resident aliens were overrepresented in U.S. graduate and professional schools relative to their concentra-

tion among baccalaureate-degree recipients. Asian Americans and non-resident aliens made greater progress than Blacks, Hispanics, and Whites both in graduate and professional enrollment and in obtaining doctoral degrees from U.S. graduate and professional schools. In addition, the enrollment of Asian Americans and non-resident aliens in U.S. graduate programs in mathematics, the physical sciences, and engineering was almost equivalent to that of Whites and 20-40 times that of Blacks and Hispanics.

Data presented on student degree attainment by field of study showed that the limited number of Blacks and Hispanics who earned degrees in engineering and the physical sciences were recipients primarily at the baccalaureate level. These minorities achieved the greatest representation in degree attainment beyond the baccalaureate level in education and the social sciences. However, even in these fields they were more likely to have obtained a master's than a doctoral degree. Blacks and Hispanics, therefore, remained far from having achieved adequate representation in graduate and professional school degree attainment or enrollment in 1980. This was especially true in graduate programs in the natural and technical sciences.

Policy recommendations based on the findings of this research and in previous studies were offered to improve the participation and success of Blacks and Hispanics in higher education.* These recommendations entailed (1) increasing the effectiveness of elementary and secondary education for minorities; (2) improving the performance of low-achieving minorities on standardized achievement tests; (3) increasing the provision of grant and fellowship aid to minority students; (4) improving higher education recruitment and selection pracices; (5) identifying programs and institutions that have demonstrated success with minority students; and (6) conducting more extensive research on minority graduate and professional students and the institutions that they attend.

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* The recommendations and conclusions of this report represent solely the views of the author. They are not, therefore, the outcomes of an official committee report, nor do they necessarily reflect the views the National Research Council.

CONTENTS

INTRODUCTION
The Struggle for Educational Opportunity Among Blacks 1

The Struggle for Educational Opportunity Among Hispanics 3

The Present Status of Blacks and Hispanics in Higher Education 4

RESEARCH FOCUS 6

DATA AND METHODOLOGY 8

FINDINGS 9
Availability of Black and Hispanic Undergraduates 9

Black and Hispanic Enrollment in U.S. Graduate and Professional Schools 10
Racial Trends in Graduate and Professional School Enrollments 10
Graduate School Enrollments 10
Professional School Enrollments 11
Race Differences in Enrollments in U.S. Graduate Schools 12
Race Differences in Enrollments in Professional Schools 13
Summary: Student Enrollments in U.S. Graduate and Professional Schools 14

Higher Educational Degree Attainment Status of Race and Sex Groups 15
Trends in Degree Attainment 15
Degree Attainment by Major Field, Race, and Sex 16
Summary: Degree Attainment Status of Minorities in Higher Education 17

Factors Associated with Higher Education Access and Attainment of Race and Sex Groups 18
Standardized Test Performance 18
Financial Aid 20
Recruitment, Selection, and Institutional Commitment 22
Characteristics of the Minority Applicant Pool 23
Additional Characteristics Affecting the Graduate and Professional School Access and Status of Blacks and Hispanics 24
Undergraduate Major and Educational Expectations 24
The Quality of Minority Elementary and Secondary Education 25
Lack of Early and Systematic Sponsorship and Precollege Socialization 26

Higher Education Attrition and the Payoffs of Higher Education Investments 26

CONCLUSIONS AND POLICY RECOMMENDATIONS 29

Increased Effectiveness of Elementary and Secondary Education for Minorities 30

Extensive Improvement in the Standardized Test Performance of Low-Performing Minorities 31

Greater Provision of Grant and Fellowship Aid to Minorities 32

Improved Higher Education Recruitment and Selection Practices 33

Identification and Reliance upon Programs and Institutions That Have Demonstrated Success with Minorities 35

More Extensive Research on Minority Graduate and Professional Students and Their Education 37

APPENDIX: TABLES 41

1 Total Undergraduate Enrollment in U.S. Colleges and Universities, by Race, 1976-1982, 43

2 Bachelor's Degrees Conferred by U.S. Institutions of Higher Education, by Race, 1976-77, 1978-79, and 1980-81, 44

3 U.S. Graduate and Professional School Enrollments of Full-Time Students, by Race, 1976-1982, 45

4 Total Full-Time Enrollments in U.S. Graduate Institutions, by Race, Sex, and Field: Fall 1982, 46

5 Total Full-Time Enrollments in U.S. Professional Institutions, by Race, Sex, and Field: Fall 1982, 47

6 Bachelor's, Master's, and Doctor's Degrees Conferred by U.S. Institutions of Higher Education, by Race, 1976-77, 1978-79, and 1980-81, 48

7 Bachelor's, Master's, and Doctor's Degrees Conferred by U.S. Institutions of Higher Education, by Race, Sex, and Major Field, 1980-81, 49

8 Mean SAT Scores, Standard Deviations, and Number of Test-Takers, by Race and Sex, 1981-1983, 51

9.1 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Biological Sciences, by Race, 1978-1983, 52

9.2 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Education, by Race, 1978-1983, 54

9.3 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Engineering, by Race, 1978-1983, 56

9.4 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Mathematics, by Race, 1978-1983, 58

9.5 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Physical Sciences, by Race, 1978-1983, 60

9.6 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Social Sciences, by Race, 1978-1983, 62

10 Mean MCAT Scores, Standard Deviations, and Number of Test-Takers, by Race, 1978-1983 (Non-Repeaters), 64

11 Mean LSAT Scores, Standard Deviations, and Number of Test-Takers, by Race, 1975-1982, 65

12 Average Graduate and Professional School Expenses for Various Subgroups of Full-Time Students, by Type of School, 1979-80 Academic Year, 66

13 Average Graduate and Professional School Financial Aid Profiles for Various Subgroups of Full-Time Students, 1979-80 Academic Year, 67

14 Application and Acceptance Rates of Blacks and Hispanics to U.S. Medical Schools, 1974-1984, 68

15 Percentage Distributions of Characteristics of Graduate Record Examination Test-Takers (U.S. Citizens Only), by Race, 69

REFERENCES 71

INTRODUCTION

The status of Blacks and Hispanics in higher education must be understood from the perspective of the broader society and its social values and norms (Sedlacek and Brooks, 1976; Bowles and Gintis, 1973; Cabrera, 1978). In emphasizing the importance of societal values and the intricate relationship between educational institutions and the broader society, Bowles and Gintis noted that it is impossible to separate institutions from the society that they serve. B. A. Thresher (1966) further argued that access to higher education is primarily a "social process" that is deeply embedded in society's cultural patterns and value system. Thus, the relationship between U.S. colleges and universities and the broader society should be kept in mind throughout this report.

The status of Blacks and Hispanics in higher education also must be viewed and understood within the context of U.S. race relations. For example, regarding Blacks, prior to the Civil War, the institution of slavery prescribed the nation's education and social policy towards this group. During that time, Blacks were not allowed to read and write. However, after persistent protest and with the assistance of northern missionaries, Blacks were able to establish their own educational institutions.[1] In addition, the idea of Blacks' assuming responsibility for their own education was later supported by the White majority, and the doctrine of "separate but equal" was constitutionally

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[1] Some of the historically Black colleges were established following the Civil War in response to the denial of Black access to established White institutions and the prohibition against Blacks' becoming literate. These institutions included Hampton University, Lincoln University, and Wilberforce College.

upheld in the Supreme Court's 1896 ruling in Plessy vs. Ferguson (Fleming, 1981).

The Struggle for Educational Opportunity Among Blacks

The prevailing sentiment among Whites was that segregated education was "the key to peace and harmony between the races and that Blacks should devote themselves to learning agriculture, mechanics and domestic services" (Fleming, 1981). However, as Blacks migrated from rural to urban areas, they realized the necessity for a liberal, in addition to a vocational, education. Therefore, DuBois (1899) and other Civil Rights leaders concluded that the doctrine of "separate but equal" education was unconstitutional and inhibited the future educational progress of Blacks (Fleming, 1981).

After Plessy, the National Association for the Advancement of Colored People (NAACP) challenged the doctrine of "separate but equal" education in a series of cases on behalf of Black plaintiffs who attempted to gain access to segregated White educational institutions (Murray vs. Maryland, 1937; Missouri, ex rel. Gaines v. Canada, 1938; Sipuel v. Board of Regents, 1948; Sweatt v. Painter, 1950). The Court's ruling in these cases in favor of the NAACP established precedence for the landmark 1954 Brown v. Board of Education of Topeka decision mandating the desegregation of U.S. public elementary and secondary schools. Almost 20 years later, the court ruled in Adams v. Richardson that U.S. public colleges and universities must be desegregated. The Adams decision, coupled with the Civil Rights movement and the Higher Education Act of 1965 (which provided the Basic Educational Opportunity Grant and other financial aid programs for minorities), had a significant impact on the participation of Blacks in higher education. Prior to these events, only one out of ten Black participants in higher education were enrolled in a predominantly White college or university. However, five years after the Adams mandate, seven out of ten Blacks were enrolled in predominantly White institutions (primarily two-year rather than four-year institutions, Arce, 1976).

The Struggle for Educational Opportunity Among Hispanics

The historical origin and status of Hispanic Americans in the United States contrasted that of Blacks (Moore and Pachon, 1985). However, like Black Americans, Hispanics were also subject to racism, stereotypes, and inequality in educational opportunity. For example, Horsman (1981) noted that the notorious Sam Houston, leader of the Texas Americans, viewed the struggle in his region as one between "a glorious Anglo-Saxon race and an inferior Mexican rabble." This type of ideology supported the overthrow of the Mexican government in Texas (Horsman, 1981).

Despite their early political struggles, Hispanic Americans, like Blacks, have been subsequently successful in asserting and establishing their rights as American citizens. For example, Hispanics have been successful in obtaining a variety of new programs to meet the cultural and educational needs of their children. Their efforts resulted in the passage of the federal Bilingual Education Act in 1968. This Act provided financial incentives for school districts to develop demonstration projects in bilingual education.

The 1970s was also a period of significant legal education action for Hispanics. During this period, the Department of Health, Education, and Welfare (DHEW), now the Department of Education, issued a memo which in part stated:

> Where inability to speak and understand the English language excludes national origin-minority group children from effective participation in the educational program offered by a school district, the district must take affirmative steps to rectify the language deficiency in order to open its instructional program to these students (Baez, Fernandez, and Guskin, 1980, page 11).

The content of this memo and DHEW's subsequent specification of guidelines regarding Hispanic education were later upheld by the U.S. Supreme Court in Lau v. Nichols (1974). The Court's decision in Lau was

considered a major victory for Hispanics in obtaining equal educational opportunity through bilingual education (Baez et al., 1980).

A second important Court decision that supported more effective education for Hispanics was Keyes v. School District No. 1. In this case the Supreme Court upheld for the first time a district court decision that placed Hispanic students under the broad category of "minority." This decision had direct implications for school desegregation cases in cities with large multi-ethnic populations. Other important cases that led to greater educational opportunity for Hispanics were Cisneros v. Corpus Christi (1970) and Aspira of New York, Inc. v. Board of Education (1974).

The Present Status of Blacks and Hispanics in Higher Education

Currently, Blacks and Hispanics are the two fastest growing racial minority groups in the United States. In 1984 Blacks were 11.7 percent of the U.S. population (approximately 26.4 million) while Hispanics comprised 6.4 percent of the U.S. population (approximately 14.6 million). Slightly more than half of the highly diverse Hispanic population are of Mexican descent and reside in the southwestern section of the United States. About one-sixth of the Hispanics are Puerto Ricans who live in or near New York. Cuban Americans, who constitute about one-twelfth of the Hispanic population, are heavily concentrated in Miami and Florida (Moore and Pachon, 1985). It is projected that by the year 2020, Hispanics will constitute the nation's largest minority --representing, at that time, approximately 14.7 percent of the population (American Council on Education, 1984). Blacks are expected to represent approximately 14 percent of the U.S. population by the year 2020 (American Council on Education, 1984).

Despite their current and projected population growth rates, only a limited proportion of Blacks and Hispanics are high school graduates and are eligible for college enrollment. In 1980 only 70 percent of the Black population and 59 percent of the Hispanics aged 18-24 com-

pleted high school as compared to 83 percent of the White population (Hill, 1983; Magallán, 1983). Also, while Blacks were 12.6 percent of the U.S. college-age population in 1980 (Bureau of Census, 1984), they were only 11 percent of the nation's high school graduates, 8 percent of the nation's four-year college population, and 6.5 percent of the nation's four-year college graduates (U.S. Office of Civil Rights, 1982). Hispanics were 7.5 percent of the college-age population in 1980, 4.5 percent of the nation's high school graduates, 3 percent of the four-year college population, and only 1.3 percent of the nation's four-year college graduates. Blacks constituted 5.5 percent of U.S. graduate school enrollments in 1980-81, 6.6 percent of medical school enrollments, and 4.4 percent of law school enrollments (Hill, 1984; Association of American Medical Colleges, 1983); Hispanics comprised 2.2 percent of graduate school enrollments, 1 percent of medical school enrollments, and less than 1 percent of law school enrollments in 1980-81 (Magallán, 1983).

RESEARCH FOCUS

Given the importance of advanced higher education for the status attainment and social mobility of minorities, this report presents data to assess the enrollment participation and degree completion status of Blacks and Hispanics in U.S. graduate and professional schools. Three objectives are pursued. First, national level data on the graduate and professional school enrollment and degree attainment of race and sex groups in various major fields are presented. Second, this report identifies factors that are associated with and/or that influence the access, matriculation, and completion status of Blacks and Hispanics in U.S. graduate and professional schools. For example, data on the performance of Blacks and Hispanics on standardized admissions tests are presented and evaluated as a factor. In addition, recent data on the percent of minority applicants versus the percent of minorities accepted to U.S. medical schools are presented and examined to assess the extent to which the size of the minority pool might be a factor. Information from other studies on additional factors (i.e., financial aid, elementary and secondary school preparation, major field choice, high school tracking) that have been associated with the higher education access and attainment of minorities is also presented.

Third and finally, this report offers suggestions for increasing the access and success of Blacks, Hispanics, and other disadvantaged minorities in higher education.[2] These suggestions are based primarily on data from this report and from others that have documented

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[2] These suggestions and any subsequent recommendations and conclusions in this study solely represent the views of the author. They do not necessarily reflect the opinions or disposition of the National Research Council.

the importance of various factors. Some of the major issues and areas on which alternatives and suggestions are based entail (1) student recruitment and admissions; (2) improving the standardized test performance of minorities; (3) elementary and secondary school academic preparation and precollege socialization; (4) earlier and more effective identification of minority talent; (5) student and institutional financial aid; (6) the identification, recognition, and support of programs and institutions that have successfully recruited, retained, and graduated minorities; and (7) the need for more comprehensive and systematic research on the experiences of minorities in graduate and professional school and on the characteristics of the graduate and professional schools that they attend.

DATA AND METHODOLOGY

While a variety of secondary data sources are employed in this report, the primary data source used is the U.S. Office of Civil Rights (OCR) Higher Education General Information Survey (HEGIS). The OCR surveys, initially conducted in 1968 and collected biennially since, entail student enrollment data by race, sex, and major field. These data are collected from all federally funded U.S. institutions of higher education. Thus, over 3,000 U.S. higher education institutions are biennially surveyed by OCR. OCR data are presented in this report on student enrollments and student degree attainment at the undergraduate, graduate, and professional levels.

The primary focus of this report is on the status of Blacks and Hispanics in graduate and professional education. However, descriptive data is also presented at the undergraduate level to examine the nature and extent of the undergraduate pool available for possible graduate and professional school access. Other data used in this report are from the Graduate Record Examination Board, the Association of American Medical Colleges, the Law School Admissions Services, and the Law School Admissions Council.

Trend data on the standardized test performance of race and sex groups are presented from the Graduate Record Examination (GRE), the Medical College Admissions Test (MCAT), the Law School Admissions Test (LSAT), and the Standardized Admissions Test (SAT). Data on the family socioeconomic background, academic performance, major field choice, and educational expectations of minority undergraduate and graduate students are drawn from the GRE.

FINDINGS

Availability of Black and Hispanic Undergraduates

Initial data on the availability of Black and Hispanic undergraduates for possible graduate and professional school access are presented in Tables 1 and 2 (see pages 43-44). Because the primary focus of this report is on Blacks and Hispanics (the two largest racial minority groups in the U.S.), data on Native Americans are not presented separately but have been combined with groups in the "Others" category in Tables 1 and 2. This aggregation permitted greater manageability and greater ease in interpreting the data. The "Others" category consists primarily of Asian Americans and non-resident aliens (i.e., over 95 percent).[3] Thus, any advantages in educational attainment noted in this report for the "Others" ethnic group category will be attributed to Asian Americans and/or non-resident aliens rather than to Native Americans.[4]

Table 1 reports trends in undergraduate enrollments for racial and ethnic groups between 1976 and 1982 while Table 2 presents baccalaureate degree completion data for these groups. Table 1 shows a slight decline in four-year college enrollments for U.S. Blacks and Whites,

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[3] In its survey, the Office of Civil Rights defined "non-resident alien" as a person who is not a citizen or national of the United States, is in the country on a temporary basis, and does not have the right to remain indefinitely.

[4] It has been reported that American Indians are the most disadvantaged minority group in the United States in terms of socioeconomic status and educational and occupational attainment. Thus, separate and systematic studies are greatly needed to better understand and improve the educational status and conditions of Native Americans (Olivas, 1979; Navarro, 1984).

but a slight increase in four-year college enrollment for Hispanics. However, given that Hispanics were 4.5 percent of the nation's high school graduates and 7 percent of the college-age population, the less than one percent increase for Hispanics in four-year college enrollment between 1976 (2.4 percent) and 1982 (3.0 percent) is not impressive and shows that, like Blacks, Hispanics are underrepresented in U.S. four-year colleges and universities.

The baccalaureate-degree attainment data in Table 2 indicate that Blacks and Hispanics have maintained a steady rate of degree completion at the four-year college level between 1976 and 1981. Thus, any decrease found in this report in the graduate and professional school access of Blacks and Hispanics cannot be attributed to a decline in the availability of Black and Hispanic baccalaureate-degree recipients.

A comparison of the B.A.-degree attainment rates in Table 2 for Blacks and Hispanics with their representation among four-year college enrollees in Table 1 indicates that both groups were underrepresented among four-year college graduates between 1976-77 and 1980-81. Table 1 shows that Blacks were 8 percent of four-year college enrollees in 1982 while Table 2 indicates that they were only 6 percent of the nation's four-year college graduates. Hispanics were 3 percent of the nation's four-year college enrollees in 1982, but only 2 percent of its four-year college graduates. Thus, adequate representation at the four-year college level, matriculation, and degree attainment are critical barriers to higher educational achievment for Blacks and Hispanics.

Black and Hispanic Enrollment in U.S. Graduate and Professional Schools

Racial Trends in Graduate and Professional School Enrollments

Table 3 (see page 45) reports U.S. graduate and professional school enrollment trends by race between 1976 and 1982.

Graduate School Enrollments

Beginning with graduate enrollments, these distributions show that Black enrollment decreased by almost 1 percent between 1976 and 1982.

Whites also experienced an enrollment decline during this time period. However, Whites still constituted over 70 percent of U.S. graduate school enrollments during each year shown in Table 3. Although Hispanics experienced a slight increase in graduate school enrollments between 1976 and 1982, they were the least represented among the four ethnic groups in Table 3. In contrast to Blacks and Hispanics, the "Other" ethnic groups (primarily Asian-Americans and non-resident aliens) were 2-9 times more likely than Blacks or Hispanics to have been enrolled in U.S. graduate schools between 1976 and 1982. These latter groups also made greater progress in increasing their enrollment in U.S. graduate schools between 1976 and 1982 than Blacks, Hispanics, or Whites.

Professional School Enrollments

In terms of professional school enrollment, Table 3 shows that Black enrollment remained at about 4.6 percent between 1976 and 1982 while Hispanic enrollment slightly increased. Also, Black enrollment in U.S. professional schools was higher than the enrollment of Hispanics or "Other" ethnic minorities in that period. Reports by Hill (1984), the National Advisory Committee on Black Higher Education and Black Colleges and Universities (1982), and the Association of Minority Health Profession Schools (1983) have attributed the higher enrollment of Blacks in professional schools than that of other racial minorities to the success of programs in Black colleges and universities (i.e., primarily the traditionally Black colleges) in enrolling and graduating Black students. These institutions graduated one-third of the Black "first professional degree" recipients in 1982 (Hill, 1984).

Despite the success of Black institutions in enrolling and graduating Black students, Table 3 shows that Black students remained underrepresented in U.S. graduate and professional schools between 1976 and 1982 in comparison to their representation among baccaulaureate-degree recipients during these time periods (see Table 2, page 44). In contrast, Hispanic representation in U.S. graduate and professional schools was about comparable to their representation among B.A.-degree recipients between 1978 and 1982 (i.e., about 2 percent).

Professional school enrollments for Whites between 1976 and 1982 (see Table 3, page 45) showed that they comprised over 87 percent of U.S. professional enrollments, which was comparable to their representation among baccalaureate-degree recipients (see Table 2) and greater than their representation in U.S. graduate schools (see Table 3). Finally, the speculation that graduate schools may be losing students as a result of an increase in student enrollments in U.S. professional schools is not supported by the data for any of the four groups in Table 3 upon comparing trends in graduate and professional school enrollments. While graduate school enrollments fluctuated (i.e., downward for Blacks and upward for Hispanics and "Other" minorities), professional school enrollment remained about the same for all groups between 1976 and 1982.

Race Differences in the Enrollments in U.S. Graduate Schools by Field of Study

Table 4 (see page 46) shows the distribution of race and sex groups in U.S. graduate schools by field of study in 1982. Presentation of the data by field of study provides a more detailed assessment of group disparities in graduate school achievement. Unfortunately, graduate enrollment data for education and the social sciences were not included in the 1982 OCR data. However, reports from previous OCR data that have included these fields showed that 26 percent of Black graduate students were enrolled in education and 15 percent were enrolled in the social sciences (Thomas, 1980). Also, data presented later in this report on graduate degree attainment by field of study show that Blacks and Hispanics continue to earn a much higher percentage of graduate degrees in education and the social sciences than in the biological and technical sciences (i.e., mathematics and engineering).

For the fields that are shown in Table 4, Blacks and Hispanics only approximated their total enrollment representation in U.S. graduate schools in 1982 in business and management (4.2 percent for Blacks and 2.2 percent for Hispanics; see Table 3). Both groups were highly underrepresented in mathematics, the physical sciences, and engineering relative to their total graduate enrollments in 1982. In contrast,

"Other" ethnic minorities (i.e., primarily Asian-Americans and non-resident aliens) were highly overrepresented in mathematics, the physical sciences, and engineering in 1982 relative to their overall representation in U.S. graduate schools. However, Whites were much more evenly distributed across all major fields in 1982 (especially in business and management, the physical sciences, and the biological sciences) relative to their total graduate enrollment during this time.

A comparison of sex differences across and within race groups shows that for all racial groups, sex differences favoring males are least pronounced in the biological sciences and most pronounced in engineering. These data also show that sex differences in mathematics favoring males is greatest among Hispanics and least pronounced among Blacks. However, in the physical sciences and in engineering, sex differences are greatest among "Other" minorities (i.e., Asian-Americans and non-resident aliens), followed by Whites, and least pronounced among Blacks.

Race Differences in Enrollments in U.S. Professional Schools by Field of Study

Table 5 (page 47) presents enrollment distributions for race and sex groups in U.S. professional schools. These data show that Whites comprised at least 85 percent of student enrollments in dentistry and medicine, and 90-95 percent of student enrollments in law and veterinary medicine. The data also reveal that among the professional fields shown, Blacks and Hispanics had the highest enrollments in medicine and law while "Other" ethnic groups had the highest enrollment in dentistry. The relatively higher representation of Blacks in medicine is largely attributed to their enrollment in the four predominantly Black medical schools (Meharry, Howard, Morehouse, and Charles Drew Medical School). These institutions educate almost one-quarter of the Black physicians who attend medical school (Association of Minority Health Profession Schools, 1984).

A comparison of the sexes within racial groups shows that professional school enrollments in dentistry and medicine favoring males were

greater among Whites than among Blacks, Hispanics, and "Other" minorities. In fact, in 1982 white male enrollment in U.S. dental schools was four times that of white females and in U.S. medical schools three times that of white females. In contrast, Hispanic and "Other" ethnic group males were only two times more highly represented in U.S. dental and medical schools than their female counterparts. Among Blacks, the enrollment of females in dentistry (1.7 percent) and medicine (2.5 percent) in 1982 was in much closer proximity to that of males (2.7 percent and 3.1 percent, respectively) relative to the other groups. In addition, the enrollment of Black females in veterinary medicine and law in 1982 slightly exceeded that of Black males. Thus, while females in general remained underrepresented in U.S. professional school programs relative to males, the disadvantage was greater for Hispanic, White, and "Other" ethnic females than for Black females.

Summary: Student Enrollments In U.S. Graduate And Professional Schools

To summarize, the most recent data from the OCR surveys revealed that Blacks and Hispanics remained underrepresented in U.S. graduate and professional schools relative to their proportional representation among baccalaureate-degree recipients. In fact, Black enrollment in U.S. graduate schools actually decreased between 1976 and 1982. Whites also experienced a decrease in graduate school enrollment during this time period. However, the decline for Whites was not as great as the decline for Blacks. Also, despite the decline for Whites, they still constituted 70 percent of the graduate student population and 88-90 percent of professional school enrollments at each time period examined. In addition, the representation of Whites in U.S. professional schools between 1976 and 1982 slightly exceeded their concentration among B.A.-degree recipients during these time periods.

An examination of enrollment trends for "Other" ethnic minorities revealed that these students made greater progress between 1976 and 1982 in enrollment in U.S. graduate schools than Blacks, Hispanics, or Whites. The graduate enrollment of these latter ethnic groups was 2-4 times higher than the graduate enrollment of Blacks and Hispanics. In

addition, their enrollment in mathematics, the physical sciences, and engineering was 20-40 times higher than the enrollment of Blacks and Hispanics. Thus, racial disparities in graduate and professional school enrollments in U.S. colleges and universities between 1976 and 1982 greatly favored Whites, Asians, and non-resident aliens over Blacks and Hispanics.

Higher Educational Degree Attainment Status

Access to higher education is one important measure of the status and progress of minorities in higher education. However, the extent to which students complete their higher education is another critical indicator of their achievement. Thus, the next set of tables presents OCR data on trends in degree attainment by race and on degrees earned by field of study for race and sex groups.

It is important to note that because the OCR data is cross-sectional and not longitudinal, no comparisons can be made between groups on their enrollment and degree attainment statuses. However, based on the degree attainment data presented, racial comparisons can be made across and within degree attainment levels (i.e., bachelor's, master's, and doctoral levels).

Trends in Degree Attainment

Table 6 (see page 48) shows trends in degree attainment by race at the bachelor's, master's, and doctoral levels between 1976 and 1981. These data show that the number and percentage of bachelor's, master's, and doctoral degrees earned by Blacks, Whites, and Hispanics remained relatively stable between 1976-77 and 1980-81. Comparisons across degree levels of the relative percentages of degrees attained by the different groups reveal that Black and Hispanic degree attainment at the doctoral level was almost 50 percent below their attainment at the bachelor's degree level. In contrast, at the M.A. and Ph.D. levels, "other ethnics" (i.e., primarily Asian Americans and non-resident aliens) were at least 50 percent above their degree attainment at the bachelor's degree level between 1976-77 and 1980-81. In addition,

these ethnic groups made greater progress than either Blacks, Hispanics, or Whites in the number and percentage of degrees that they earned at each degree level during these time periods.

Degree Attainment by Major Field, Race, and Sex

Table 7 (see page 49) reports the number and percentage of degrees earned by race and sex groups in various undergraduate and graduate majors in 1980-81. The most obvious finding for all racial groups (with the exception of the "Other" ethnic groups) is that as the level of higher education increases (i.e., from undergraduate to graduate), the percentage of degrees earned by each group decreases. This is especially true for Blacks and Hispanics--even in education and the social sciences, where these groups have a relatively high rate of undergraduate and graduate enrollment (Trent, 1984; Thomas, 1980). Table 7 shows that while Blacks were 8.1 percent of the B.A. recipients in the social sciences during this time period, they were only 3 percent of the Ph.D. recipients in the social sciences.

Table 7 also shows that in 1980-81, Black and Hispanic degree attainment at all degree levels was lower in engineering and the physical sciences than in any of the remaining fields. In addition, these data show that Blacks and Hispanics were greatly underrepresented among master's and doctoral degree-holders in the biological sciences and mathematics compared to other groups and relative to their representation among baccalaureate-degree recipients. In contrast, Asian Americans and non-resident aliens were more likely to earn doctoral than master's and baccalaureate degrees in the biological sciences, mathematics, engineering, and the physical sciences. This is primarily attributed to the fact that many of these students who attend U.S. colleges and universities for graduate study have previously earned their bachelor's degrees outside the United States (Brown and Stent, 1977).

The low representation of Blacks and Hispanics among master's and doctoral degree recipients in engineering and the physical sciences in Table 7 has been attributed to the lack of availability of these groups in these fields at the undergraduate level (Duran, 1983; Astin, 1982;

Olivas, 1979). However, the relatively sizeable proportion of Black and Hispanic baccalaureate-degree recipients in mathematics, the biological, and social sciences in Table 7 does not suggest a problem of pool availability at the graduate school level. On the other hand, studies have documented that a lack of adequate encouragement and financial aid restricts the retention of minority undergraduates in these majors and their access to graduate programs in these fields (Malcom, Hall, and Brown, 1976; Fox, 1976; Berryman, 1983; Thomas, 1984). Lastly, the distributions in Table 7 show that while very few students obtained doctoral degrees in business and management in 1980-81, Whites and "Other" ethnic minorities were much more likely to do so than Blacks and Hispanics.

Summary: Degree Attainment Status of Minorities in Higher Education

To summarize, recent trends in OCR degree attainment data by race showed that the proportion of doctoral degrees earned by Blacks and Hispanics was less than 50 percent of the proportion of degrees that these groups earned at the baccalaureate level. However, the doctoral degree attainment rates of "Other" ethnic minorities (primarily Asian Americans and non-resident aliens) and Whites exceeded their B.A.-degree attainment rate by 50 percent. Thus, obtaining the Ph.D. degree was the "norm" for these latter groups but the exception for Blacks and Hispanics.

Secondly, data presented on degree attainment by field of study revealed that Blacks and Hispanics were obtaining degrees in engineering and the physical sciences primarily at the baccalaureate level, and only modestly so at the master's level in biology and the social sciences. These data also showed that Blacks and Hispanics achieved the greatest representation in degree attainment beyond the B.A. level in education and the social sciences. But even in these fields they were more likely to have obtained a master's than a doctoral degree. Thus, these data, like the graduate and professional enrollment data previously presented, clearly indicate that Blacks and Hispanics were far from having achieved parity in graduate and professional degree attain-

ment in enrollment in 1980. This was especially true in graduate programs in the natural and technical sciences.

Factors Associated With Higher Education Access and Attainment

The findings previously presented from recent Office of Civil Rights data suggested that within the present decade Blacks and Hispanics have made minimal progress in graduate and professsional school access and attainment, despite affirmative action and desegregation efforts. Thus, an important question is "Why?" More specifically, what are the factors that inhibit or enhance the higher educational access and success of minorities and women? The important role and impact of U.S. history and race relations were previously noted as critical factors that influence the educational achievement of these groups. However, despite the significance of these factors, a more useful focus for policy purposes entails identifying variables that can be altered or manipulated to produce a positive effect on the achievement and attainment of racial minorities in higher education. Therefore, a variety of student and institutional level variables that have been identified in the literature as affecting the status of minorities in higher education will be discussed in this section.

The three most important factors impacting the progress of Blacks and Hispanics in higher education are (1) standardized test performance (Morris, 1979; Thomas, 1981; Duran, 1983); (2) financial aid (Flamer et al., 1982; Cross, 1984; Astin and Cross, 1981); and (3) institutional recruitment and selection practices (Blackwell, 1981; Orfield et al., 1984; Institute for the Study of Education Policy, 1980; Council of Graduate Schools in the U.S., 1984; Boone, Young and Associates, 1984; Copeland, 1984).

Standardized Test Performance

A recent study by the Educational Testing Service (ETS) indicated that only 2.4 percent of the Black Graduate Record Examination (GRE) test-takers scored above 600 on the verbal section and only 4.1 percent scored above 600 on the quantitative section of the test as compared

to 22 percent and 20 percent, respectively, for the White test-takers. A second study by Thomas (1981) showed that if high standardized test performance was the major criterion for undergraduate admissions, only 17 percent of the Black respondents in the National Longitudinal Survey of High School Seniors (1972) would have attended college as opposed to the 31 percent that actually attended.[5]

Duran (1983) and Olivas (1979) have made similar observations regarding Hispanic Americans. However, despite the poor performance of Blacks and Hispanics on standardized achievement tests, these tests are still a major criterion for undergraduate, graduate, and professional school admissions (Boone, Young and Associates, 1984; Copeland, 1984; Scott and Shaw, 1985).

The data presented in Tables 8-11 (pages 51-65) show trends in the standardized test performance of Blacks, Hispanics, and "Other" ethnic groups who applied for admission to U.S. undergraduate, graduate, and professional schools. Student mean scores on the SAT in 1981-83 are presented in Table 8 (see page 51). The highest possible individual score on each component (i.e., verbal and mathematics) of the SAT is 800. These distributions show that while Black students made the greatest progress in improving their test performance between 1981 and 1983 (i.e., 12 point gain for Black males vs. 14 point for Black females), neither Black males nor Black females scored a <u>total</u> of 800 in SAT during any of those three time periods. Table 8 also shows that females (especially Black females) scored lower than males on the mathematics and verbal section of the SAT during all three time periods. Morris (1979) and others (Scott and Shaw, 1985; Berryman, 1983) have reported that inadequate elementary and secondary school preparation, insufficient knowledge and experience of Blacks and Hispanics

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[5] The composite index of standardized test performance that was constructed by the National Center of Education Statistics was employed in this study. It consisted of an equally factor-weighted linear composite of four standardized subtests that were administered to students. The scores on these subtests were summed, weighted, and trichotomized into low, medium, and high categories.

with test-taking methodology, and test bias are factors contributing to the low performance of these students on standardized aptitude tests.

Tables 9.1-9.6 (see pages 52-63) report the mean GRE scores for racial groups by undergraduate major. On each section of the test, the mean GRE scores range from 220 to 800. These data show that in all fields, and on all three components of the test, the average White student scored higher than the average Mexican American, Puerto Rican, or Black student during the earliest (1978-79) and the most recent (1982-83) time periods reported. Blacks and Puerto Ricans had the lowest mean GRE scores during these two periods. Comparisons across major fields show that on all three components of the GRE, and for all racial groups (including Whites), undergraduate majors in engineering and the physical sciences achieved the highest GRE scores, while undergraduate majors in education and the social sciences achieved the lowest GRE scores.

The final two tables, Tables 10 and 11 (see pages 64-65), report the mean scores of racial groups on the medical (MCAT) and law (LSAT) school admissions tests. The mean score distributions on the MCAT show that White students had the highest achievement scores on these tests during each time period shown, while Puerto Ricans and Blacks had the lowest mean scores. Whites also had the highest mean scores on the LSAT while Blacks had the lowest scores. However, Black test-takers made greater mean score gains on the LSAT and MCAT between 1975-76 and 1981-82 than any of the other racial groups shown. Despite the increase in the test performance of Blacks noted here, and more recently by the Educational Testing Service (Anrig, 1984), the low performance of Blacks and Hispanics on these tests in general still constitutes a major barrier to their access to higher education (Bailey, 1978; Morris, 1979; Copeland, 1984).

Financial Aid

Having the necessary financial resources to support graduate and professional education is just as critical for Blacks, Hispanics, and other disadvantaged minorities as having adequate credentials to gain

admissions to higher education. Students who pursue graduate or professional education incur greater expense than undergraduates and are more likely to obtain loans than grant awards (Flamer et al., 1982). In 1980 graduate and professional students borrowed approximately $1.3 billion in private capital through the Graduate Student Loan (GSL) Program. Also, over one-half of the nation's graduate and professional students relied on GSL as a steady source of support (Flamer et al., 1982). In addition, professional school students augmented the GSL with Health Education Assistance Loans (HEAL).[6]

Tables 12 (see page 66) and 13 (see page 67) present data on the cost of graduate and professional education by discipline, as well as data on the type and amount of financial aid awarded to Blacks, Hispanics, and other racial groups. Regarding graduate and professional school costs, comparisons by discipline show that in public and private institutions, tuition and fees and total expenses in 1979-80 were greatest for medical and law school students. These students were much more likely to receive loan assistance than other students and were therefore more heavily indebted than students in other disciplines. By the end of four academic years, students at private medical schools averaged debts of approximately $31,000 vs. $21,000 for students at public medical schools. The next most heavily indebted students were law school students, who at private schools incurred debts of about $24,000 vs. $10,400 at public schools. Students in the arts and sciences in private institutions incurred debts of about $7,350 vs. $6,030 for public school students in the arts and sciences (Flamer et al., 1982).

In terms of racial patterns, Flamer et al. (1982) reported that Black students in public graduate and professional schools were primarily aided by College Work Study, while Blacks in private institutions relied heavily on National Defense Student Loans. Copeland (1984) and Morris (1979) reported that Black and Hispanic students have

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[6] Between 1980-81 and 1981-82, there was a five-fold increase in the number of students who borrowed from HEAL at an interest rate above 13 percent (Association of Minority Health Professional Schools, 1983).

a strong bias towards accepting educational loans (especially high interest rate ones) because of family responsibilities and existing financial obligations. Lack of financial support was the major reason that Black and Hispanic respondents to the National Longitudinal Survey gave for not pursuing a college, graduate, or professional education (Thomas, 1981). Also, Orfield et al. (1984) and Astin and Cross (1981) found that grant awards (i.e., BEOGs) had a more positive influence on the retention and access of Black and Hispanic undergraduate and graduate students than loan awards. Therefore, both the type and amount of financial awards offered to minorities are important contingencies for their higher education access and success.

Two specific factors have been noted as important in affecting the success of Blacks and Hispanics in obtaining financial aid. First, Black and Hispanic students are more likely to pursue undergraduate, graduate, and professional school on a part-time rather than on a full-time basis (Thomas, McPartland, and Gottfredson, 1981). As a result, these students take longer to complete their schooling than other students (Syverson and Forster, 1983). Secondly, a large number of minority students are late in applying for financial aid and do not provide complete and/or accurate information (Boone, Young and Associates, 1984). These two factors may bias minority students' chances of receiving financial aid as well as the type of aid that they receive.

Recruitment, Selection, and Institutional Commitment

Institutional selection and recruitment processes are a third set of factors that influence minority student access to higher education (Morris, 1979; Institute for the Study of Education Policy, 1980; Baratz, 1984; Council of Graduate Schools in the U.S., 1984). Results from a survey by the Council of Graduate Schools' Committee on Minority Graduate Education (1984) showed that law and medical school programs were three times more likely to have minority recruitment programs than were graduate programs in the arts and sciences. In addition, 44 percent of the law schools surveyed by the Committee and 53 percent of the medical school programs had academic assistance and tutorial pro-

grams for minorities. However, less than 33 percent of the graduate programs in the arts and sciences reported having these programs.

Blackwell (1981) and Magallán (1983) have also reported that there is often a poor match between the demographic characteristics of recruitment and admissions officers, committee members, and prospective minority applicants. These researchers and Sedlacek and Brooks (1976) have noted that unless effective measures are implemented to carefully interview and select potential recruiters and admissions officers, the biases and lack of knowledge of these individuals could inhibit, rather than enhance, minority student access and retention. Also, studies (Boone, Young, and Associates, 1984; Council of Graduate Schools in the U.S., 1984) have found that the goals and objectives of various colleges and universities, as well as the characteristics and priorities of their faculty and student body, strongly influence institutional recruitment and selection practices.

Characteristics of the Minority Applicant Pool

The limited size and quality of the minority applicant pool also have been hypothesized as factors that inhibit the success of graduate and professional schools in recruiting minorities. However, apart from general information on the background characteristics of SAT and GRE takers, national data on the quality of minority undergraduates and graduate students are very limited. Graduate and professional schools do compile data on the number of applicants and the number of acceptants at their institutions. Table 14 (see page 68) reports this information for Blacks and Hispanics in U.S. medical schools between 1974-75 and 1983-84.

Table 14 shows that while the percentage of applicants to U.S. medical schools was relatively stable for Mexican Americans and Puerto Ricans between 1979-80 and 1983-84, it slightly increased for Blacks during this time period. At the same time, the rate of acceptance of Blacks and Mexican Americans to U.S. medical schools slightly decreased while the acceptance rates for Puerto Ricans slightly increased. Joan

Baratz (1984) made a similar observation from her recent study of the medical education of Black students. Her conclusion that the present halt in Black enrollment in U.S. medical schools cannot be attributed to a decline in the Black applicant pool appears to be supported by the data in Table 14.

Additional Characteristics Affecting the Graduate and Professional School Access and Success of Blacks and Hispanics

The data presented in Table 14 (and also in Table 2, page 44) suggested that the size of the Black and Hispanic applicant pool does not adequately explain the low access and representation of these groups in U.S. graduate and professional schools. However, standardized test performance has been documented in this report and in previous studies (Morris, 1979; Committee on Minority Graduate Education, 1984; Thomas, 1981) as an important factor that limits the access of Blacks and Hispanics to higher education. Also, Scott and Shaw (1985) presented data that questioned the applicability and reliability of GRE scores in predicting Black students' graduate school performance. Finally, the socioeconomic background, the quality of their elementary and secondary education, and early academic tracking practices are additional factors that have been associated with the access and success of minorities in higher education (Astin, 1982; Alexander and Eckland, 1974; Smith and Dziuban, 1977). These factors along with other characteristics (i.e., undergraduate major educational aspirations) will be discussed in this section.

Undergraduate Major and Educational Expectations. Table 15 (see page 69) provides data on various characteristics of Black, Hispanic, and White undergraduates who took the Graduate Record Examination (GRE). These data show that Black, Hispanic, and White undergraduates were largely majoring in education and the social sciences between 1979-80 and 1982-83. In fact, for every time period shown, over 50 percent of Blacks and Hispanics were enrolled in the social sciences. The disproportionate overrepresentation of these minorities in education and the social sciences has been noted as a factor that limits their

availability for graduate studies in the natural and technical sciences (Sells, 1976; Fox, 1976).

The extent to which students have high educational expectations is also a factor that influences their educational attainment (Gurin and Epps, 1975; Allen, 1985; Sewell, Haller, and Ohlendorf, 1970). Recent studies on race differences that have controlled for social class background and ability have reported higher educational aspirations for Blacks than for Whites (Allen, 1985; Kerckhoff and Campbell, 1977). The distributions on educational expectations in Table 15 also show that Black and Hispanic undergraduates expressed slightly higher educational expectations than Whites. However, the lower-income family background, as well as the lower high school and college grade performance of Blacks and Hispanics relative to Whites (also shown in Table 15), severely limits their educational attainment despite their high educational aspirations and expectations.

The Quality of Minority Elementary and Secondary Education. The poor quality of elementary and secondary education that many Black and Hispanic students receive also has been identified as a critical factor limiting their access to and success in higher education (National Commission on Excellence in Education, 1983; Study Group on the Conditions of Excellence in American Higher Education, 1984; National Science Board, Commission on Precollege Education in Mathematics, Science and Technology, 1984). In 1980 Black students constituted 16 percent of the nation's public elementary and secondary school enrollment (Plisko, 1984). Forty-one percent of Black public school students were enrolled in low income, predominantly Black, inner city schools. Many of these schools had high student attrition rates, a decline in state aid, and limited curricula and teaching resources (Smith and Dziuban, 1977).

Black and Hispanic students are not adequately represented in high school academic curricula and are less likely to have taken advanced high school mathematics and science than Whites and males (Berryman, 1984; Thomas, 1984; Marrett, 1981; Sells, 1976). Also, these minori-

ties receive less encouragement than Whites and males to enroll in advanced mathematics and science courses and to pursue college majors in these subjects (Malcom, Hall, and Brown, 1976; Thomas, 1984). Thus, the quality of their elementary and secondary schools, their academic track placement, and the adequacy of their mathematics and science education are additional factors that negatively influence the achievement of Blacks and Hispanics in higher education.

Lack of Early and Systematic Sponsorship and Precollege Socialization. Because many disadvantaged minorities do not have the type of family support networks and role models that facilitate their access to higher education and social mobility, having access to such external supports is extremely important for these groups. Crain and Mahard (1978) found that the lower the proportion of Black teachers in secondary schools and the lower the degree of interaction of Black students with Black teachers, the lower Black students' high school grade performance and college attendance. In addition, Blackwell (1981) found that the presence of Black faculty in U.S. graduate and professional schools was the most significant predictor of Black graduate school retention.

Acquiring appropriate educational socialization and/or resocialization is also important for the higher educational access and success of disadvantaged minorities. Studies have reported that traditional race and sex socialization transmitted by families and schools are barriers to the educational and career aspirations of minorities (Persell, 1977; Maccoby and Jacklin, 1974; Berryman, 1983). Scott (1981) and others (Allen, 1981; Magallán, 1983) have also reported that Black and Hispanic students experience social adjustment problems at predominantly White colleges, in part because of a lack of early exposure to these campuses as well as a disparity between the norms, culture, and values at these institutions and those that minority students bring to these institutions.

Higher Education Attrition and the Payoffs of Higher Education Investments. Two additional variables found to affect the graduate and professional school access of minorities are educational attrition at

earlier levels of schooling and minority students' perceptions of the payoffs and trade-offs of investing in advanced higher education. Studies show that Black and Hispanic students are less likely to persist at all levels of schooling (i.e., elementary, secondary, postsecondary, graduate, and professional) than White students (Pantages and Creedon, 1978; Nettles, 1984; Allen, 1985). However, the extent to which minority students experience attrition is, to some extent, related to the racial composition and other characteristics of the institutions they attend (Pascarella and Terenzini, 1979; Thomas, 1981; Braddock and McPartland, 1980). For example, Thomas (1981) found that Black students who attended predominantly Black four-year colleges had higher retention rates than their counterparts in predominantly White four-year colleges. In addition, Braddock and McPartland (1980) found that Black undergraduates who had previously attended predominantly White high schools and were enrolled in predominantly White four-year colleges had higher retention rates than their Black classmates who had previously attended predominantly Black high schools.

Finally, regarding the payoff of higher educational investments, independent of (i.e., controlling for) ability and educational attainment, Blacks and females achieve lower levels of occupational attainment than Whites and males (Welch, 1973; Treas, 1976; Coleman, Berry and Blum, 1971). In addition, Lebold et al. (1983) noted that part of the difficulty in recruiting Black undergraduate engineering majors for graduate study is that while many Black and White undergraduates in these fields receive attractive salary offers and jobs (especially the more competitive ones), Black students are more inclined to accept these offers and delay or forego graduate studies. Also, the trade-offs that minorities may be required to make (in terms of family commitments and additional higher education expenses) are factors that limit the access of Blacks, Hispanics, and other disadvantaged minorities to graduate and professional schools (Cross, 1984; Flamer et al., 1982). Implications and policy recommendations regarding these issues will be discussed in the concluding section of this report.

CONCLUSIONS AND POLICY RECOMMENDATIONS*

This report presented student enrollment and degree completion data from the most recent U.S. Office of Civil Rights Surveys. Trend data on student enrollment and degree attainment were also presented. The major conclusion derived from these data was that despite past and present government and other institutional efforts (i.e., private foundations, program initiatives by institutions of higher education), Blacks and Hispanics have made minimal progress in achieving access to and obtaining degrees from U.S. graduate and professional institutions. In contrast, Whites, Asian-Americans, and non-resident aliens have made substantial progress in access and degree attainment in U.S. graduate and professional schools.

Both individual and institutional level variables were identified in this report in attempting to explain the present status of minorities in higher education. Thus, policy recommendations that address both types of variables will be made in concluding this report (see footnote 2, page 6). Some of these recommendations have been made in previous studies (Blackwell, 1981; Cabrera, 1978; Duran, 1983; Orfield et al., 1984). The present recommendations will primarily focus on how representatives from various educational, federal, and private organizations might intervene to increase the higher education attainment of disadvantaged minorities.

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* As noted earlier, this report is the work of an individual, not of an official committee of the National Research Council. Thus, the conclusions and recommendations cited here do not necessarily represent the views of the Research Council.

Increased Effectiveness of Elementary and Secondary Education for Minorities

The underrepresentation of Blacks and Hispanics in U.S. graduate and professional schools (particularly in the natural and technical sciences) documented in this report has been partly attributed to the poor quality of elementary and secondary school education that many of these students receive (Astin, 1982; National Science Board, Commission on Precollege Education in Mathematics, Science and Technology, 1984). Independent of their academic ability, disadvantaged minority students more often attend poorly funded inner-city public schools and are more often assigned to special education and vocational programs than majority students (Felice and Richardson, 1977; Smith and Dziuban, 1977; Orfield et al., 1984). Thus, a systematic, nationally based effort may be needed to improve the quality of elementary and secondary education of disadvantaged minority students.

An initial strategy might entail the provision of special state and federal matching grants to improve the elementary and secondary education for minorities.[7] These funds could be used to (1) improve the facilities and quality of instruction and curricula (especially in mathematics and science) in low-income, inner-city schools; (2) support viable programs and experimental programs to increase the interest and participation of minorities in mathematics and science; and (3) develop retention programs at the elementary and secondary levels that would involve parents, students, and teachers.

A second strategy might entail the implementation of local and state minority talent search and development programs to identify and further develop the educational and career interests and skills of minority elementary and secondary students. These programs should be especially geared towards increasing the interest and academic perfor-

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[7] The funding program proposed here might be patterned after the Emergency School Assistance Act Program, designed to assist and facilitate elementary and secondary school desegregation.

mance of minorities in mathematics and science and preparing these students for college and graduate education. In addition, they should facilitate the early exposure of minority students to various college environments and to a variety of educational and occupational role models. Also, consortia and information exchange networks between elementary and secondary schools and colleges and universities should be established as linkages to assist promising minority students in gaining systematic access and in successfully matriculating at all higher levels in the educational pipeline.

Third, improving the expectations and attitudes of elementary and secondary school teachers and counselors toward minorities may be important. Studies have shown that Black and Hispanic students receive less encouragement to pursue majors and careers in the natural and technical sciences than White students (Fox, 1976; Sells, 1976; Thomas, 1983). Thus, efforts to better match minority students with supportive and experienced teachers may prove useful. Also, improving the academic quality of the teachers who instruct and counsel minority elementary and secondary students may be essential. Orfield et al. (1984) recently reported that inner-city elementary and secondary schools with large populations of minority students are less likely to have teachers with advanced degrees, or teachers with credentials from select colleges and universities than suburban public schools that have fewer minority and low-income students. Rosenthal (1973) and Rosenbaum (1976) have noted that teacher quality and teacher expectations are significantly related to students' performance and achievement.

Extensive Improvement in the Standardized Test Performance of Low-Performing Minorities

The data presented in this report suggest that substantial improvement in the test performance of Blacks and Hispanics is an imperative. Both short- and long-term intervention may be needed to achieve this goal. For example, an immediate approach might entail designing test-taking courses and incorporating them as an integral part of high

school and college curricula and student requirements.[8] More long-term and effective strategies will require improving upon and expanding the test-taking ability of minority students and also improving standardized tests, including reducing test bias. Also, standardized achievement tests should be administered and readministered to minority students as early as possible during the elementary and junior high school years to permit ample time for these students to improve their performance.

College and university officials can also assist Blacks and Hispanics in overcoming the barrier of test performance in the admissions process. For example, admissions officers and committees that rely heavily on high standardized test scores as a basis for selecting minorities might give special attention to determining the effectiveness of standardized test scores in predicting the subsequent educational achievement and success of minorities. Studies have indicated that undergraduate, graduate, and professional school admissions tests are not very useful beyond predicting students' first-year grade performance (Boone, Young and Associates, 1984). Bailey (1978) also reported that 90 percent of minority students who were admitted to medical school under special admission policies became practicing physicians. In addition, Wellington and Montero (1978) and Calkins and Willoghby (1981) reported that college and university officials who had previously assigned heavy weight to students' grades and test performance, but who had subsequently extended their admissions requirements to include noncognitive factors, were more successful in enrolling and retaining minority students.

Greater Provision of Grant and Fellowship Aid to Minorities

A lack of adequate financial aid and a fear of financial indebtedness were noted in this report as two of the major reasons that Black

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[8] Students who systematically demonstrate high performance on these tests might be exempted from these courses.

and Hispanic students frequently report for not beginning or continuing their studies. In addition, grant aid has been shown more effective than educational loans in increasing minority student access to and retention in higher education (Astin and Cross, 1981; Cross, 1984). In addition, Blacks and Hispanics are less likely to receive pre- and post-doctoral awards and research and teaching assistantships than majority students (Copeland, 1984; Council of Graduate Schools in the U.S., 1984; Smith, 1980). Therefore, greater financial aid in the form of grant and fellowship aid may be necessary to increase the participation of these groups in graduate and professional education.

Presently, many private foundations (such as Ford and Rockefeller) and the National Science Foundation are assuming an important role in providing undergraduate, graduate, and postdoctoral fellowship opportunities for minorities. Other organizations in the private as well as the public sector might also invest in the education of minorities (e.g., through supporting educational and occupational fellowship opportunities). In doing so, these organizations, along with currently active foundations, should give special attention to (1) expanding the number and type of pre- and post-doctoral educational and occupational fellowship opportunities for disadvantaged minorities; (2) assuring that such fellowship programs designed for minorities are administered by colleges and universities and other organizations that have demonstrated commitment to and success in recruiting and retaining minorities; and (3) sponsoring evaluation studies on the subsequent progress of minorities who have participated in various fellowship programs.

Improved Higher Education Recruitment and Selection Practices

The recommendations suggested thus far have primarily addressed student level intervention (i.e., increasing the standardized test performance and early academic preparation of minorities). However, improving higher educational recruitment and selection practices for minorities is also an important area of intervention (Bailey, 1978; Council of Graduate Schools in the U.S., 1984; Boone, Young and Asso-

ciates, 1984). For example, college and university administrators might find it useful to provide students (and the public in general) with more detailed information and greater clarity about the type and quality of students they desire and the relative importance of various criteria that they employ in selecting students.

It is also important that colleges and universities systematically evaluate and reassess their recruitment and selection practices and monitor their success in increasing the number of Black and Hispanic students. For example, it has been reported that all of the predominantly White colleges and universities associated with the Committee on Institutional Cooperation (CIC) experienced declines in Black student enrollment in 1973, 1978, and 1983 (Copeland, 1984).[9] Also, 60 percent of the doctoral degrees awarded to Blacks in 1980-81 were awarded by only 10 percent of the Ph.D.-granting institutions (including Howard and Atlanta universities--two traditionally Black institutions) in the United States (Hill, 1984). Therefore, detailed case studies of universities that have experienced both decreases and increases in Black and Hispanic student enrollment and retention should prove useful.

Finally, upon successfully recruiting minorities, college and university officials must also assess the extent to which they have been successful in meeting the special needs of minority students on their campuses. Findings by Boone, Young and Associates (1984) and the Commission on the Higher Education of Minorities (1982) reported that at predominantly White colleges and universities, the following factors inhibited the success of minority students: (1) unequal access to financial resources between minority and White graduate students; (2) lack of success in obtaining faculty to serve as mentors or advisors;

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[9] Colleges and universities that are members of the CIC include University of Illinois, Indiana University, University of Chicago, University of Iowa, University of Michigan, Michigan State University, University of Minnesota, Northwestern University, Ohio State University, Purdue University, and University of Wisconsin. This consortium, established in 1957, is one of the largest producers of doctoral recipients annually (Copeland, 1984).

(3) lack of role models, at all institutional levels, to foster the personal and professional aspirations of minority students; (4) inadequate support from administrators; and (5) institutional insensitivity and indifference to minority student needs in general.

Identification and Reliance Upon Programs and Institutions That Have Demonstrated Success with Minorities

The findings in this report show that Blacks and Hispanics have not made adequate progress in higher education access and degree attainment. In addition, this report and other studies (Astin, 1982; Allen, 1985; Astin and Cross, 1981; Cross, 1984) have identified factors that have restricted or inhibited the progress of these minorities in higher education. However, apart from having knowledge about barriers to minority educational achievement, educators and administrators need information on variables and especially on programs and institutions that have enhanced the educational achievement of minorities.

For example, one program that has experienced success in recruiting and retaining minority students in engineering is the University of Massachusetts-Amherst Recruitment and Retention Program for Minority Engineers (Bromery, 1981). This campus-based program was designed in 1968 to recruit and retain minorities (i.e., Blacks, Puerto Ricans, Cape Verdeens, and American Indians) in the university's undergraduate engineering program. The program is unique in that it (1) was developed and operated by minority faculty; (2) received broad support from the university; (3) was supported by university, state, and federal funds; and (4) recruited highly motivated minorities with average total SAT scores of less than 800. Approximately 65 percent of the students who participated in the program graduated within four years. As a result of the success of the undergraduate program, the university implemented a similar program for minority students at the graduate level.

The Minority Access to Research Careers Program (MARC) is another program that has successfully increased the number of Black and His-

panic graduates in the biological sciences (Garrison, 1985). This undergraduate program was initiated in 1977 to increase the number of minority students who could successfully compete for enrollment into biomedical graduate school programs. The program engages students in a highly structured curricula and provides participants with stipends and tuition support. The MARC program is also targeted at institutions with high enrollments of minorities. A recent evaluation of the MARC program by Garrison (1985) indicated that the program has increased the number of Black and Hispanic graduate students in the biological sciences.

A third and final program that has demonstrated success in recruiting and retaining minorities is the North Carolina School of Science and Mathematics (Beasley, 1985). This high school intervention program was begun in 1980 to increase the interest, participation, and matriculation of eleventh- and twelfth-graders in mathematics and science. The program is targeted at students in the state of North Carolina and is fairly balanced on race and sex relative to the pro- portions among high school students in the state (Beasley, 1985). The unique features of the program are its massive, full-time recruitment efforts and its use of non-traditional standards in recruiting and selecting female and minority students. Program recruiters visit local churches, civic organizations, and neighborhoods to recruit students. In addition, program admission officers rely heavily on grades and on the interviews of potential students, their parents, and other individuals in the local community as a basis for assessing potential candidates. The North Carolina program has had four cohorts of students and a 99 percent success rate in retaining students and facilitating their enrollment in undergraduate programs (Beasley, 1985).[10]

Lastly, efforts to learn from the experiences of traditionally Black colleges and other institutions that have been successful in en-

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[10] Obviously, a variety of other programs have had some positive effect on minority student higher educational access and retention. Thus, programs cited here are mere examples and not exclusive of other programs.

rolling and retaining Blacks, Hispanics, and other disadvantaged students should be useful. Studies that were cited previously in this report showed that the traditionally Black colleges and universities have been more successful than predominantly White colleges and universities in providing moral and social support for Black students, in enrolling Black students in the natural and technical sciences, and in retaining and graduating Black students (Trent, 1984; Thomas, 1981, Allen, 1984; National Advisory Committee on Black Higher Education and Black Colleges and Universities, 1982). In addition, these institutions have graduated one-half of the Black baccalaureate-degree recipients, one-third of the Black master's-degree recipients, and one-third of the Black "first professional degree" recipients (Hill, 1984). Thus, in addition to learning from the experiences of these institutions, efforts to strengthen and expand the academic programs and curricular offerings of these institutions also may be valuable.

More Extensive Research on Minority Graduate and Professional Students and Their Education

The final recommendation in this report calls for more comprehenhensive and longitudinal research on minority graduate and professional school students and the institutions they attend. Presently, the OCR data are the best available national data set with a representative sample of minority graduate and professional school students. However, these data are of limited use because they are descriptive and are collected at the institutional level only. More detailed national longitudinal data on minority graduate and professional students are needed.

Survey and interview data on the characteristics and conditions of the colleges and universities that minority students attend are also needed. Presently, institutional data on colleges and universities are limited to information on student and faculty enrollment characteristics (i.e., racial composition, student enrollment and degree status, faculty rank). Such data should entail information on the admissions and recruitment processes of colleges and universities, the characteristics and composition of admissions and recruitment committees, en-

rollment and retention patterns of minority students and faculty at various colleges and universities, the financial aid status of institutions, the type of financial aid awarded to minorities, the availability of academic and social support programs for minorities, and the attitudes and perceptions of college and university administrators and faculty regarding minority students and minority issues. The Survey of Minority Graduate Education by the Council of Graduate Schools in the U.S. (1984) represents one attempt to collect these types of data. However, a similar but more extensive national survey of graduate and professional institutions and students is needed to better understand the trends and patterns in student enrollment and degree attainment found in this report.

Studies on the attrition of Black and Hispanic students at the elementary and secondary levels of schooling and throughout higher education are also needed. Duran (1983) and Magallán (1983) have noted that the problem of attrition is most severe for Hispanics at the elementary and secondary level. Astin (1982) and others (National Advisory Committee on Black Higher Education and Black Colleges and Universities, 1982; Institute for the Study of Education Policy, 1980) have reported that attrition for Blacks is problematic at all levels of schooling.

Third, the data in this report and in previous studies (Thomas, 1984; Werts, 1966) indicate that major field choice and access to various college majors are important variables in understanding the higher education and career achievement of minorities. Thus, more detailed studies on factors underlying students' major field status may be useful in understanding and increasing the representation of Blacks and Hispanics in the physical sciences and engineering documented in this report.

Last, studies on the academic background and achievement of Asian Americans and non-resident aliens who attend U.S. colleges and universities are needed. The data in this report indicated that these groups have made the greatest progress in graduate and professional

school access and degree attainment. Studies that more effectively describe these groups and the socioeconomic and cultural background factors that are associated with their success in U.S. colleges and universities (particularly in mathematics, the physical sciences, and engineering) might facilitate the development of more appropriate and/or more effective educational policies and programs for these and other minority groups.

To summarize, the recommendations offered in this report suggest a variety of alternatives for federal and state governments, for private foundations, and for colleges and universities themselves. However, serious consideration of any one or a combination of these recommendations will require additional financial support for elementary, secondary, and higher education and for educational research at each of these levels. These recommendations will also require reordering the nation's agenda for higher education. Therefore, this report concludes with the rhetorical question, "Who will pay and at what price to better educate and increase the higher educational access and success of the nation's disadvantaged minorities?"

APPENDIX

TABLE 1 Total Undergraduate Enrollment in U.S. Colleges and Universities, by Race, 1976-1982[a]

Year	Type of Institution	Blacks N	Blacks %	Hispanics[b] N	Hispanics[b] %	Whites N	Whites %	Others[c] N	Others[c] %
1976	4yr	603,000	8.5	173,000	2.4	5,984,000	84.4	329,000	6.5
	2yr	429,000	11.1	210,000	5.4	3,077,000	76.4	162,000	5.7
1978	4yr	611,755	8.5	190,354	2.6	6,027,221	83.7	373,377	5.2
	2yr	442,570	11.0	226,917	5.6	3,166,512	78.6	192,142	4.8
1980	4yr	633,994	8.4	216,602	2.9	6,273,023	82.9	442,599	5.8
	2yr	472,451	10.4	255,084	5.6	3,558,470	78.7	235,402	5.2
1982	4yr	612,300	8.0	228,669	3.0	6,305,579	82.4	501,498	6.5
	2yr	489,199	10.3	290,581	6.1	3,691,538	77.9	268,504	5.7

[a]Total undergraduate enrollments include full-time and part-time enrollments.

[b]Hispanics are U.S. citizens who are Mexican, Puerto Rican, Cuban, Central or South American, or of other Spanish origin.

[c]Others include American Indians or Alaskan Natives, Asians, and non-resident aliens.

SOURCES: American Council on Education, Minorities in Higher Education, Third Annual Status Report, 1984; Office of Minority Concerns, Washington, D.C; U.S. Department of Health, Education, and Welfare, National Center for Education Statistics, unpublished data from the Surveys of Fall Enrollments in Institutions of Higher Education, 1978-1982.

TABLE 2 Bachelor's Degrees Conferred by U.S. Institutions of Higher Education, by Race, 1976-77, 1978-79, and 1980-81

Group	1976-77		1978-79		1980-81	
	N	%	N	%	N	%
Blacks	58,515	6.4	60,130	6.5	60,673	6.5
Hispanics[a]	18,663	2.0	20,029	2.2	21,832	2.3
Whites	805,186	88.0	799,617	87.3	807,319	86.4
Others[b]	32,767	3.6	36,571	4.0	44,976	4.8
TOTAL	915,131	100.0	916,347	100.0	934,800	100.0

[a]Hispanics are U.S. citizens who are Mexican, Puerto Rican, Cuban, Central or South American, or of other Spanish origin.

[b]Others include American Indians, Alaskan Natives, Asians, and non-resident aliens.

SOURCE: U.S. Office of Civil Rights, unpublished data from the Higher Education General Information Survey (HEGIS), 1976-1981.

TABLE 3 U.S. Graduate and Professional School Enrollments of Full-Time Students, by Race, 1976-1982

Group	Graduate		Professional	
	N	%	N	%
Blacks				
1976	22,058	5.1	10,029	4.6
1978	20,985	4.9	20,260	4.4
1980	22,162	5.0	11,490	4.6
1982	17,883	4.2	11,214	4.6
Hispanics[a]				
1976	8,045	1.9	4,104	1.9
1978	8,325	2.0	4,845	2.1
1980	9,842	2.2	5,997	2.4
1982	9,228	2.2	6,528	2.7
Whites				
1976	340,876	79.6	198,063	90.0
1978	331,006	78.1	207,912	89.9
1980	334,104	75.5	223,316	89.3
1982	314,496	74.0	214,091	88.3
Others[b]				
1976	57,367	13.4	7,841	3.5
1978	63,760	15.0	8,220	3.6
1980	76,296	17.3	9,244	3.7
1982	83,258	19.6	10,616	4.4
TOTAL				
1976	428,346	100.0	220.037	100.0
1978	424,076	100.0	231,237	100.0
1980	442,404	100.0	250,047	100.0
1982	424,865	100.0	242,449	100.0

[a]Hispanics are U.S. residents who are Mexican, Puerto Rican, Cuban, Central or South American, or of other Spanish origin.

[b]Others include American Indians or Alaskan Natives, Asians, and non-resident aliens.

SOURCE: U.S. Office of Civil Rights, unpublished data from the Higher Education General Information Survey (HEGIS), 1976-1982.

TABLE 4 Total Full-Time Enrollments in U.S. Graduate Institutions, by Race, Sex, and Field: Fall 1982

Groups	Business & Management		Mathematics		Physical Sciences		Engineering		Biological Sciences	
	N	%	N	%	N	%	N	%	N	%
Blacks	2,608	4.0	93	1.4	307	1.2	458	1.2	595	2.5
Males	1,458	2.2	54	.8	225	.9	363	1.0	293	1.2
Females	1,150	1.8	39	.6	82	.3	95	.2	302	1.3
Hispanics[a]	1,193	1.8	63	1.0	339	1.3	381	1.0	350	1.5
Males	763	1.2	42	.9	266	1.0	329	.9	193	.8
Females	430	.6	21	.1	73	.3	52	.1	157	.7
Whites	49,641	76.2	3,603	55.8	17,870	70.9	18,555	49.7	19,205	80.5
Males	32,618	50.1	2,506	38.8	14,072	55.8	15,875	42.5	11,561	48.5
Females	17,023	26.1	1,097	17.0	3,798	15.1	2,680	7.2	7,644	32.0
Others[b]	11,675	18.0	2,694	41.7	6,700	26.6	17,968	48.0	3,697	15.5
Males	9,145	14.0	2,062	31.9	5,492	21.8	16,858	45.1	2,375	9.9
Females	2,530	4.0	632	9.8	1,208	4.8	1,110	2.9	1,322	5.6
TOTAL	65,117	100.0	6,453	100.0	25,216	100.0	37,362	100.0	23,847	100.0
Males	43,984	67.5	4,664	72.3	20,055	79.5	33,425	89.5	14,422	60.5
Females	21,133	32.5	1,789	27.7	5,161	20.5	3,937	10.5	9,425	39.5

[a]Hispanics are U.S. citizens who are Mexican, Puerto Rican, Cuban, Central or South American, or of other Spanish origin.

[b]Others include American Indians, Alaskan Natives, Asians, and non-resident aliens.

TABLE 5 Total Full-Time Enrollments in U.S. Professional Institutions, by Race, Sex, and Field: Fall 1982

Groups	Dentistry		Medicine		Veterinary Medicine		Law	
	N	%	N	%	N	%	N	%
Blacks	951	4.4	3,758	5.6	149	1.8	4,677	4.8
Males	581	2.7	2,099	3.1	58	.7	2,294	2.3
Females	370	1.7	1,659	2.5	91	1.1	2,383	2.5
Hispanics[a]	605	2.8	2,116	3.1	116	1.4	2,760	2.8
Males	441	2.0	1,463	2.2	73	.9	1,718	1.7
Females	164	.8	653	.9	43	.5	1,042	1.1
Whites	18,477	85.6	58,452	86.4	7,821	95.0	88,269	90.0
Males	15,066	69.8	42,214	62.4	4,273	51.9	56,049	57.1
Females	3,411	15.8	16,238	24.0	3,548	43.1	32,220	32.9
Other[b]	1,556	7.2	3,318	4.9	143	1.7	2,400	2.4
Males	1,122	5.2	2,277	3.4	78	.9	1,459	1.5
Females	434	2.0	1,041	1.5	65	.8	941	.9
TOTAL	21,589	100.0	67,644	100.0	8,229	100.0	98,106	100.0
Males	17,210	79.7	48,053	71.0	4,482	54.5	61,520	62.7
Females	4,379	20.3	19,591	29.0	3,747	45.5	36,586	37.3

[a]Hispanics are U.S. citizens who are Mexican, Puerto Rican, Cuban, Central or South American or of other Spanish origin.

[b]Others include American Indians, Alaskan Natives, Asians, and non-resident aliens.

TABLE 6 Bachelor's, Master's, and Doctor's Degrees Conferred by U.S. Institutions of Higher Education, by Race, 1976-77, 1978-79, and 1980-81

Groups	Degree					
	B.A.		M.A.		Ph.D.	
	N	%	N	%	N	%
Blacks						
1976-77	58,515	6.4	21,024	6.7	1,253	3.8
1978-79	60,130	6.5	19,393	6.4	1,267	3.9
1980-81	60,673	6.5	17,133	5.8	1,265	3.9
Hispanics[a]						
1976-77	18,663	2.0	6,069	1.9	522	1.6
1978-79	20,029	2.2	5,544	1.8	439	1.3
1980-81	21,832	2.3	6,461	2.2	456	1.4
Whites						
1976-77	805,186	88.0	265,147	84.0	26,836	81.0
1978-79	799,617	87.3	249,051	83.0	26,128	80.0
1980-81	807,319	86.4	241,216	82.0	25,908	78.9
Others[b]						
1976-77	32,767	3.6	23,420	7.4	4,500	13.6
1978-79	36,571	4.0	25,899	8.7	4,830	14.8
1980-81	44,976	4.8	29,373	10.0	5,210	15.8
TOTAL						
1976-77	915,131	100.0	315,660	100.0	33,111	100.0
1978-79	916,347	100.0	299,887	100.0	32,664	100.0
1980-81	934,800	100.0	294,183	100.0	32,839	100.0

[a]Hispanics are U.S. citzens who are Mexican, Puerto Rican, Cuban, Central or South American or of other Spanish origin.

[b]Others include American Indians, Alaskan Natives, Asians, and non-resident aliens.

SOURCE: U.S. Office of Civil Rights, unpublished data from the Higher Education General Information Survey (HEGIS), 1976-1981.

TABLE 7 Bachelor's, Master's, and Doctor's Degrees Conferred by U.S. Institutions of Higher Education, by Race, Sex, and Major Field, 1980-81

Groups	Biological Sciences						Business and Management					
	B.A.		M.A.		Ph.D.		B.A.		M.A.		Ph.D.	
	N	%	N	%	N	%	N	%	N	%	N	%
Blacks	2,269	5.3	171	2.9	64	1.7	13,400	6.7	2,359	4.1	32	3.7
Hispanics[a]	1,144	2.6	69	1.2	40	1.1	4,114	2.0	869	1.5	2	c
Whites	37,276	86.3	5,210	87.2	3,177	85.4	174,198	86.7	47,474	82.5	619	73.4
Others[b]	2,527	5.8	528	8.7	437	11.8	9,145	4.6	6,839	11.9	191	22.6
TOTAL	43,216	100.0	5,978	100.0	3,718	100.0	200,857	100.0	57,541	100.0	844	100.0
Males	24,149	55.9	3,654	61.1	2,666	71.7	127,058	63.2	43,045	74.8	719	85.2
Females	19,067	44.1	2,324	38.9	1,052	28.3	73,799	36.8	14,496	25.2	125	14.8

Groups	Education						Engineering					
	B.A.		M.A.		Ph.D.		B.A.		M.A.		Ph.D.	
	N	%	N	%	N	%	N	%	N	%	N	%
Blacks	9,494	8.8	8,645	8.8	614	7.8	2,449	3.3	360	1.5	24	.9
Hispanics[a]	2,847	2.6	2,831	2.9	140	1.8	1,433	1.9	278	1.7	23	.9
Whites	93,724	86.6	82,779	84.1	6,391	80.9	60,848	81.2	10,147	62.0	1,352	53.0
Others[b]	2,200	2.0	4,125	4.2	755	9.5	10,224	13.6	5,673	34.7	1,152	45.2
TOTAL	108,265	100.0	98,380	100.0	7,900	100.0	74,954	100.0	16,358	100.0	2,551	100.0
Males	27,069	25.0	28,079	28.5	4,164	52.7	67,255	87.3	14,998	91.7	2,447	95.9
Females	81,196	75.0	70,301	71.5	3,736	47.3	7,699	12.7	1,360	8.3	104	4.1

Table 7 (continued)

Groups	Mathematics						Physical Sciences					
	B.A.		M.A.		Ph.D.		B.A.		M.A.		Ph.D.	
	N	%	N	%	N	%	N	%	N	%	N	%
Blacks	584	5.2	67	2.6	9	[c]	906	3.8	107	2.0	32	1.0
Hispanics[a]	185	1.7	40	1.6	6	[c]	405	1.7	55	1.1	23	.7
Whites	9,445	85.3	1,890	73.7	507	69.6	21,246	88.7	4,155	78.7	2,445	77.9
Others[b]	864	7.8	568	22.1	206	28.3	1,393	5.8	950	18.2	640	20.4
TOTAL	11,078	100.0	2,565	100.0	728	100.0	23,950	100.0	5,227	100.0	3,140	100.0
Males	6,342	57.2	1,690	65.9	614	84.3	18,062	75.4	4,144	79.3	2,764	88.0
Females	4,736	42.8	875	34.1	114	15.7	5,888	24.6	1,083	20.7	376	12.0

[a]Hispanics are U.S citizens who are Mexican, Puerto Rican, Cuban, Central or South American, or of other Spanish origin.

[b]Others include American Indians, Alaskan Natives, Asians, and non-resident aliens.

[c]Percentages are calculated where the number (N) for a given racial group is less than 20. In these instances, total percentages may not sum to 100.

TABLE 8 Mean SAT Scores, Standard Deviations, and Number of Test-Takers by Race and Sex, 1981-1983

		Blacks				Mexican Americans			
		Male		Female		Male		Female	
		Math	Verbal	Math	Verbal	Math	Verbal	Math	Verbal
1981		(N=29,903)	(N=29,910)	(N=45,522)	(N=45,524)	(N=7,003)	(N=7,004)	(N=7,400)	(N=7,401)
	$\bar{X}$ =	381	341	350	327	439	383	392	364
	SD =	103	98	85	93	107	101	95	97
1982		(N=29,411)	(N=29,412)	(N=44,453)	(N=44,456)	(N=7,087)	(N=7,088)	(N=7,633)	(N=7,634)
	$\bar{X}$ =	385	348	354	335	441	386	394	367
	SD =	102	99	85	96	109	102	94	100
1983		(N=28,472)	(N=28,473)	(N=43,016)	(N=43,017)	(N=7,292)	(N=7,293)	(N=8,022)	(N=8,022)
	$\bar{X}$ =	388	346	356	335	443	385	393	367
	SD =	102	98	86	95	110	101	94	97

		Puerto Ricans*				Whites			
		Male		Female		Male		Female	
		Math	Verbal	Math	Verbal	Math	Verbal	Math	Verbal
1981		(N=3,109)	(N=3,108)	(N=3,930)	(N=3,930)	(N=343,672)	(N=343,739)	(N=375,504)	(N=375,644)
	$\bar{X}$ =	428	377	371	348	508	447	459	364
	SD =	113	106	96	103	113	104	104	102
1982		(N=3,064)	(N=3,065)	(N=3,922)	(N=3,923)	(N=340,440)	(N=340,520)	(N=370,475)	(N=370,628)
	$\bar{X}$ =	424	378	377	335	510	448	459	440
	SD =	112	105	97	105	114	103	105	102
1983		(N=3,296)	(N=3,295)	(N=4,183)	(N=4,184)	(N=328,459)	(N=328,608)	(N=356,498)	(N=356,611)
	$\bar{X}$ =	427	379	374	355	510	448	460	439
	SD =	113	109	97	104	116	102	106	101

* In 50 States and D.C. only.

SOURCE: Admissions Testing Program of the College Board, Profiles, College-Bound Seniors, 1981-1983.

TABLE 9.1 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Biological Sciences, by Race, 1978-1983

Year		Blacks			Mexican Americans		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=1,174)	(N=1,174)	(N=1,174)	(N=224)	(N=224)	(N=224)
	$\bar{X}$ =	358	381	359	407	448	421
	SD =	98	111	110	107	122	117
1979-80		(N=878)	(N=878)	(N=878)	(N=152)	(N=152)	(N=152)
	$\bar{X}$ =	385	411	386	460	503	486
	SD =	98	99	106	96	108	118
1980-81		(N=873)	(N=873)	(N=873)	(N=152)	(N=152)	(N=152)
	$\bar{X}$ =	394	417	393	474	502	475
	SD =	101	109	109	114	107	119
1981-82		(N=731)	(N=731)	(N=731)	(N=145)	(N=145)	(N=145)
	$\bar{X}$ =	394	414	410	459	516	478
	SD =	101	109	100	106	109	115
1982-83		(N=620)	N=620)	(N=620)	(N=122)	(N=122)	(N=122)
	$\bar{X}$ =	399	426	416	447	506	465
	SD =	96	102	99	96	105	110

Year		Puerto Ricans			Whites		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=229)	(N=229)	(N=229)	(N=17,948)	(N=17,948)	(N=17,948)
	$\bar{X}$ =	398	450	401	521	569	553
	SD =	101	103	107	104	104	102
1979-80		(N=221)	(N=221)	(N=221)	(N=16,099)	(N=16,099)	(N=16,099)
	$\bar{X}$ =	391	454	398	527	575	566
	SD =	116	106	119	100	98	98
1980-81		(N=200)	(N=200)	(N=200)	(N=15,084)	(N=15,084)	(N=15,084)
	$\bar{X}$ =	362	440	382	528	579	568
	SD =	93	101	104	99	97	101
1981-82		(N=216)	(N=216)	(N=216)	(N=12,973)	(N=12,973)	(N=12,973)
	$\bar{X}$ =	382	444	410	530	581	565
	SD =	106	106	101	98	96	110
1982-83		(N=219)	(N=219)	(N=219)	(N=11,217)	(N=11,217)	(N=11,217)
	$\bar{X}$ =	380	441	408	530	587	573
	SD =	94	104	110	99	97	110

SOURCE: Educational Testing Service, A Summary of Data Collected from Graduate Record Examinations Test-Takers During 1978-79 and 1982-83, Princeton, New Jersey.

TABLE 9.2 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Education, by Race, 1978-1983

Year		Blacks			Mexican Americans		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=2,178)	(N=2,178)	(N=2,178)	(N=484)	(N=484)	(N=484)
	$\bar{X}$ =	323	315	313	361	356	350
	SD =	84	87	88	83	93	93
1979-80		(N=2,157)	(N=2,157)	(N=2,157)	(N=491)	(N=491)	(N=491)
	$\bar{X}$ =	318	313	310	360	361	356
	SD =	82	85	86	93	95	96
1980-81		(N=1,795)	(N=1,795)	(N=1,795)	(N=481)	(N=481)	(N=481)
	$\bar{X}$ =	324	315	321	366	354	361
	SD =	85	84	88	95	93	94
1981-82		(N=1,531)	(N=1,531)	(N=1,531)	(N=453)	(N=453)	(N=453)
	$\bar{X}$ =	321	308	344	343	339	371
	SD =	81	86	80	84	99	90
1982-83		(N=1,155)	(N=1,155)	(N=1,155)	(N=357)	(N=357)	(N=357)
	$\bar{X}$ =	320	307	344	361	361	371
	SD =	81	86	79	96	102	85

Year		Puerto Ricans			Whites		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=122)	(N=122)	(N=122)	(N=21,947)	(N=21,947)	(N=21,947)
	$\bar{X}$ =	352	347	336	449	455	471
	SD =	99	91	93	98	104	109
1979-80		(N=129)	(N=129)	(N=129)	(N=21,762)	(N=21,762)	(N=21,762)
	$\bar{X}$ =	356	345	335	447	454	474
	SD =	87	90	98	98	102	110
1980-81		(N=125)	(N=125)	(N=125)	(N=19,763)	(N=19,763)	(N=19,763)
	$\bar{X}$ =	344	351	347	449	455	475
	SD =	78	100	93	98	105	111
1981-82		(N=145)	(N=145)	(N=145)	(N=15,763)	(N=15,815)	(N=15,815)
	$\bar{X}$ =	342	345	364	450	459	476
	SD =	92	102	98	97	107	106
1982-83		(N= 93)	(N= 93)	(N= 93)	(N=13,738)	(N=13,738)	(N=13,738)
	$\bar{X}$ =	358	345	374	449	463	481
	SD =	86	92	94	98	108	109

SOURCE: Educational Testing Service, A Summary of Data Collected from Graduate Record Examinations Test-Takers During 1978-79 and 1982-83, Princeton, New Jersey.

TABLE 9.3 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Engineering by Race, 1978-79-1983

Year		Blacks			Mexican Americans		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=230)	(N=230)	(N=230)	(N= 98)	(N= 98)	(N= 98)
	$\bar{X}$ =	403	521	437	434	595	487
	SD =	105	146	132	105	119	116
1979-80		(N=213)	(N=213)	(N=213)	(N= 85)	(N= 85)	(N= 85)
	$\bar{X}$ =	418	556	456	479	599	515
	SD =	103	108	117	112	103	114
1980-81		(N=277)	(N=277)	(N=277)	(N=102)	(N=102)	(N=102)
	$\bar{X}$ =	415	552	454	439	617	509
	SD =	106	116	119	101	85	105
1981-82		(N=285)	(N=285)	(N=285)	(N=111)	(N=111)	(N=111)
	$\bar{X}$ =	416	565	473	476	628	536
	SD =	105	112	118	97	84	115
1982-83		(N=265)	(N=265)	(N=265)	(N=120)	(N=120)	(N=120)
	$\bar{X}$ =	444	571	475	468	626	530
	SD =	97	106	106	99	87	116

Year		Puerto Ricans			Whites		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N= 83)	(N= 83)	(N= 83)	(N=7,021)	(N=7,021)	(N=7,021)
	$\bar{X}$ =	390	583	439	527	675	587
	SD =	88	91	101	101	96	94
1979-80		(N= 85)	(N= 85)	(N= 85)	(N=7,146)	(N=7,146)	(N=7,146)
	$\bar{X}$ =	409	581	449	527	680	596
	SD =	95	103	120	101	87	94
1980-81		(N= 89)	(N= 89)	(N= 89)	(N=7,300)	(N=7,300)	(N=7,300)
	$\bar{X}$ =	397	579	439	526	679	599
	SD =	100	80	110	102	83	96
1981-82		(N= 98)	(N= 98)	(N= 98)	(N=7,176)	(N=7,176)	(N=7,176)
	$\bar{X}$ =	411	602	473	525	679	599
	SD =	113	90	111	97	80	110
1982-83		(N=102)	(N=102)	(N=102)	(N=8,264)	(N=8,264)	(N=8,264)
	$\bar{X}$ =	417	602	489	537	685	607
	SD =	106	92	125	100	75	113

SOURCE: Educational Testing Service, A Summary of Data Collected from Graduate Record Examinations Test-Takers During 1978-79 and 1982-83, Princeton, New Jersey.

TABLE 9.4 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Mathematics, by Race, 1978-1983

Year		Blacks			Mexican Americans		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=336)	(N=336)	(N=336)	(N= 43)	(N= 43)	(N= 43)
	$\bar{X}$ =	364	486	401	420	595	467
	SD =	95	104	108	133	106	135
1979-80		(N=323)	(N=323)	(N=323)	(N= 37)	(N= 37)	(N= 37)
	$\bar{X}$ =	356	493	401	429	596	508
	SD =	93	116	111	88	98	100
1980-81		(N=315)	(N=315)	(N=315)	(N= 52)	(N= 52)	(N= 52)
	$\bar{X}$ =	360	483	397	433	576	485
	SD =	94	109	107	124	93	120
1981-82		(N=326)	(N=326)	(N=326)	(N= 40)	(N= 40)	(N= 40)
	$\bar{X}$ =	360	476	414	450	601	524
	SD =	95	120	108	102	103	102
1982-83		(N=321)	(N=321)	(N=321)	(N= 56)	(N= 56)	(N= 56)
	$\bar{X}$ =	376	483	429	469	603	524
	SD =	108	123	119	98	88	116

Year		Puerto Ricans			Whites		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N= 46)	(N= 46)	(N= 46)	(N=4,559)	(N=4,559)	(N=4,559)
	$\bar{X}$ =	375	550	412	537	682	602
	SD =	108	103	108	111	93	92
1979-80		(N= 47)	(N= 47)	(N= 47)	(N=4,741)	(N=4,741)	(N=4,741)
	$\bar{X}$ =	396	551	437	537	679	608
	SD =	118	103	124	112	91	93
1980-81		(N= 39)	(N= 39)	(N= 39)	(N=4,548)	(N=4,548)	(N=4,548)
	$\bar{X}$ =	384	549	442	541	676	612
	SD =	117	96	122	110	89	94
1981-82		(N= 46)	(N= 46)	(N= 46)	(N=4,502)	(N=4,502)	(N=4,502)
	$\bar{X}$ =	377	519	429	538	676	621
	SD =	93	129	116	108	86	111
1982-83		(N= 63)	(N= 63)	(N= 63)	(N=4,692)	(N=4,692)	(N=4,692)
	$\bar{X}$ =	406	564	473	543	676	624
	SD =	103	102	113	110	84	112

SOURCE: Educational Testing Service, A Summary of Data Collected from Graduate Record Examinations Test-Takers During 1978-79 and 1982-83, Princeton, New Jersey.

TABLE 9.5 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Physical Sciences, by Race, 1978-1983

Year		Blacks			Mexican Americans		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=266)	(N=266)	(N=266)	(N= 66)	(N= 66)	(N= 66)
	$\bar{X}$ =	391	462	406	509	600	516
	SD =	104	118	113	89	92	94
1979-80		(N=252)	(N=252)	(N=252)	(N= 49)	(N= 49)	(N= 49)
	$\bar{X}$ =	401	480	412	483	565	501
	SD =	100	111	112	108	113	112
1980-81		(N=264)	(N=264)	(N=264)	(N= 47)	(N= 47)	(N= 47)
	$\bar{X}$ =	398	466	406	448	570	498
	SD =	99	110	112	93	89	104
1981-82		(N=234)	(N=234)	(N=234)	(N= 53)	(N= 53)	(N= 53)
	$\bar{X}$ =	409	485	436	465	558	508
	SD =	101	108	100	108	113	116
1982-83		(N=246)	(N=246)	(N=246)	(N= 63)	(N= 63)	(N= 63)
	$\bar{X}$ =	409	479	436	489	591	532
	SD =	99	106	95	108	114	114

Year		Puerto Ricans			Whites		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N= 73)	(N= 73)	(N= 73)	(N=8,654)	(N=8,654)	(N=8,654)
	$\bar{X}$ =	418	532	433	541	639	581
	SD =	111	109	123	106	101	96
1979-80		(N= 92)	(N= 92)	(N= 92)	(N=8,450)	(N=8,450)	(N=8,450)
	$\bar{X}$ =	388	519	407	538	637	584
	SD =	107	100	122	106	101	99
1980-81		(N= 89)	(N= 89)	(N= 89)	(N=8,494)	(N=8,494)	(N=8,494)
	$\bar{X}$ =	388	517	413	542	636	587
	SD =	108	92	108	104	97	99
1981-82		(N=107)	(N=107)	(N=107)	(N=8,004)	(N=8,004)	(N=8,004)
	$\bar{X}$ =	382	520	432	534	633	580
	SD =	103	99	106	103	96	113
1982-83		(N=103)	(N=103)	(N=103)	(N=8,384)	(N=8,384)	(N=8,384)
	$\bar{X}$ =	393	529	435	538	634	584
	SD =	94	89	108	104	95	115

SOURCE: Educational Testing Service, A Summary of Data Collected from Graduate Record Examinations Test-Takers During 1978-79 and 1982-83, Princeton, New Jersey.

TABLE 9.6 Mean GRE Scores, Standard Deviations, and Number of Test-Takers in Social Sciences, by Race, 1978-1983

Year		Blacks			Mexican Americans		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N=1,645)	(N=1,645)	(N=1,645)	(N=223)	(N=223)	(N=223)
	$\bar{X}$ =	343	337	333	409	413	404
	SD =	87	94	96	98	103	105
1979-80		(N=1,610)	(N=1,610)	(N=1,610)	(N=205)	(N=205)	(N=205)
	$\bar{X}$ =	343	342	340	406	404	402
	SD =	89	93	97	83	97	94
1980-81		(N=1,576)	(N=1,576)	(N=1,576)	(N=181)	(N=181)	(N=181)
	$\bar{X}$ =	349	340	344	400	398	408
	SD =	93	98	100	88	103	100
1981-82		(N=1,316)	(N=1,316)	(N=1,316)	(N=195)	(N=195)	(N=195)
	$\bar{X}$ =	345	334	367	401	403	426
	SD =	90	102	88	89	118	102
1982-83		(N=1,253)	(N=1,253)	(N=1,253)	(N=140)	(N=140)	(N=140)
	$\bar{X}$ =	341	330	369	399	402	414
	SD =	90	97	90	95	110	105

Year		Puerto Ricans			Whites		
		GRE V	GRE Q	GRE A	GRE V	GRE Q	GRE A
1978-79		(N= 93)	(N= 93)	(N= 93)	(N=10,380)	(N=10,380)	(N=10,380)
	$\bar{X}$ =	363	378	362	484	496	506
	SD =	101	116	114	101	109	108
1979-80		(N= 87)	(N= 87)	(N= 87)	(N=10,214)	(N=10,214)	(N=10,214)
	$\bar{X}$ =	375	391	380	485	496	512
	SD =	98	100	109	102	109	108
1980-81		(N= 72)	(N= 72)	(N= 72)	(N=10,175)	(N=10,175)	(N=10,175)
	$\bar{X}$ =	363	366	364	483	496	513
	SD =	101	102	105	99	112	111
1981-82		(N=104)	(N=104)	(N=104)	(N= 8,686)	(N= 8,686)	(N= 8,686)
	$\bar{X}$ =	359	365	392	483	500	510
	SD =	84	103	85	100	113	111
1982-83		(N= 97)	(N= 97)	(N= 97)	(N= 7,783)	(N= 7,783)	(N= 7,783)
	$\bar{X}$ =	386	386	398	487	502	516
	SD =	102	101	102	102	114	113

SOURCE: Educational Testing Service, A Summary of Data Collected from Graduate Record Examinations Test-Takers During 1978-79 and 1982-83, Princeton, New Jersey.

TABLE 10 Mean MCAT Scores, Standard Deviations, and Number of Test-Takers by Race, 1978-1983 (Non-Repeaters)

		Blacks		Mexican Americans		Puerto Ricans		Whites	
		MCAT Reading	MCAT Quant.	MCAT Reading	MCAT Quant.	MCAT Reading	MCAT Quant.	MCAT Reading	MCAT Quant.
1977		(N=3,272)		(N=559)		(N=232)		(N=40,985)	
	$\bar{X}$ =	5.16	4.69	6.63	6.24	5.32	5.16	8.41	8.44
	SD =	2.63	2.29	2.42	2.47	3.01	2.53	2.09	2.28
1978		(N=2,458)		(N=475)		(N=191)		(N=30,303)	
	$\bar{X}$ =	5.09	4.91	6.91	6.43	5.30	5.18	8.49	8.42
	SD =	2.77	2.15	2.51	2.31	3.16	2.40	2.16	2.36
1979		(N=2,158)		(N=422)		(N=160)		(N=27,290)	
	$\bar{X}$ =	5.33	4.82	6.53	6.07	5.62	5.36	8.43	8.33
	SD =	2.44	2.24	2.37	2.39	2/82	2/66	2.03	2.15
1980		(N=2,294)		(N=432)		(N=198)		(N=27,790)	
	$\bar{X}$ =	4.94	4.76	6.53	6.14	5.15	5.09	8.35	8.18
	SD =	2.66	2.06	2.55	2.29	3.00	2.43	2.16	2.37
1981		(N=2,118)		(N=460)		(N=192)		(N=25,972)	
	$\bar{X}$ =	4.74	4.73	6.42	6.11	5.24	5.24	9.09	2.32
	SD =	2.62	1.98	2.52	2.18	3.05	2.76	2.19	2.32
1982		(N=2,223)		(N=440)		(N=215)		(N=25,630)	
	$\bar{X}$ =	5.05	4.83	6.52	6.09	5.42	5.33	8.39	8.09
	SD =	2.69	2.05	2.57	2.28	3.12	2.53	2.16	2.36
1983		(N=2,250)		(N=500)		(N=222)		(N=26,532)	
	$\bar{X}$ =	5.32	4 91	6.66	6.22	5.31	5.15	8.43	8.20
	SD =	2.74	2.09	2.63	2.27	2.97	2.40	2.18	2.34

SOURCE: Association of American Medical Colleges, Division of Educational Measurement and Research. Medical College Admission Test: Percentile Rank Ranges for MCAT areas of Assessment--1977-1983, Summary of Score Distributions.

TABLE 11 Mean LSAT Scores, Standard Deviations, and Number of Test-Takers, by Race, 1975-1982

Group		1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
Blacks		(N= 5,272)	(N= 5,364)	(N= 5,217)	(N= 4,745)	(N= 6,160)	(N= 6,665)	(N= 6,424)
	$\bar{X}$ =	403	409	414	414	410	414	421
	SD =	98	101	98	96	99	98	98
Chicanos		(N= 1,293)	(N= 1,419)	(N= 1,386)	(N= 1,260)	(N= 1,236)	(N= 1,332)	(N= 1,259)
	$\bar{X}$ =	443	452	455	457	455	464	471
	SD =	99	102	98	98	98	103	101
Puerto Ricans		(N = 930)	(N = 924)	(N= 944)	(N= 987)	(N= 1,160)	(N= 1,361)	(N= 1,454)
	$\bar{X}$ =	357	379	388	380	485	495	503
	SD =	111	113	106	112	112	109	112
Whites		(N=50,890)	(N=58,437)	(N=52,764)	(N=49,241)	(N=78,433)	(N=84,694)	(N=84,147)
	$\bar{X}$ =	547	552	558	557	556	561	569
	SD =	95	93	97	93	97	99	99

SOURCE: Provided by Clifford Adelman, National Institute of Education, Washington, D.C., 1985.

TABLE 12 Average Graduate and Professional School Expenses for Various Subgroups of Full-Time Students, by Type of School, 1979-80 Academic Year

	Public					Private					Totals*				
	N	Tuition/ Fees	Books/ Supplies	Living Expense	Total Expense	N	Tuition/ Fees	Books/ Supplies	Living Expenses	Total Expense	N	Tuition/ Fees	Books/ Supplies	Living Expense	Total Expenses
Discipline															
Arts and Sciences	634	$1,203	$272	$5,071	$ 6,546	406	$3,417	$327	$5,640	$ 9,384	1,062	$ 2,069	$293	$5,318	$ 7,680
Law	363	1,850	320	4,837	7,007	635	4,135	351	5,094	9,580	1,018	3,290	339	4,987	8,616
Medicine	760	2,553	794	5,666	9,013	483	6,758	904	5,264	12,926	1,252	4,191	834	5,504	10,529
Business	124	1,619	272	5,257	7,148	126	4,839	357	4,983	10,179	251	3,228	312	5,096	8,638
Other	407	1,588	415	5,180	7,183	490	4,031	320	5,188	9,639	909	2,910	417	5,156	8,483
Race															
Black	106	1,749	408	5,563	7,720	87	3,838	418	5,331	9,587	199	2,728	411	5,425	8,564
Hispanic	78	1,486	437	5,931	7,854	71	4,989	536	5,150	10,675	152	3,126	482	5,499	9,107
White	1,945	1,898	472	5,253	7,623	1,843	4,613	486	5,281	10,380	3,840	3,209	476	5,249	8,934
Other	159	1,442	623	5,215	7,280	139	4,834	520	4,866	10,220	303	13,025	573	5,016	8,614
Student's Family Size															
1	1,296	1,766	472	4,226	6,464	807	4,199	505	4,354	9,058	2,139	2,692	481	4,265	7,438
2	360	1,681	485	6,746	8,912	206	4,482	586	6,930	11,998	625	2,852	526	6,821	10,199
3	221	2,075	514	7,445	10,034	290	4,930	487	5,436	10,853	517	3,687	498	5,711	9,896
4 or more	245	2,417	487	6,282	9,186	444	5,446	484	5,079	10,347	699	4,359	483	5,474	10,316
TOTALS	2,288	1,845	479	5,288	7,612	2,140	4,609	487	5,251	10,347	4,494	3,172	480	5,250	8,902

SOURCE: Herbert J. Flamer, Dwight H. Horchard, and Susan Davis, Talented and Needy Graduate and Professional Students, Educational Testing Service: Princeton, New Jersey, page 5.5.

TABLE 13 Average Graduate and Professional School Financial Aid Profiles for Various Subgroups of Full-Time Students, 1979-80 Academic Year

Subgroups	Public					Private					Totals*				
	N	Grant	Work	Loan	Total Aid	N	Grant	Work	Loan	Total Aid	N	Grant	Work	Loan	Total Aid
Year															
First Year	1,209	$2,075	$2,438	$3,996	$5,505	1,184	$2,551	$2,299	$5,185	$7,150	2,425	$2,343	$2,378	$4,596	$6,313
Continuing	910	$1,810	$2,954	$4,672	$6,513	832	$2,600	$2,669	$6,009	$8,610	1,775	$2,217	$2,950	$5,321	$7,504
Discipline															
Arts and Sciences	493	$2,441	$3,487	$2,410	$5,499	330	$3,674	$1,312	$3,854	$7,127	819	$1,029	$1,429	$3,026	$6,136
Law	349	$1,340	$1,779	$3,853	$5,128	620	$1,670	$2,490	$5,062	$7,014	989	$1,545	$2,233	$4,605	$6,386
Medicine	738	$2,147	$1,874	$5,917	$7,084	480	$2,930	$1,691	$7,643	$9,498	1,226	$2,498	$1,793	$6,613	$8,046
Business	116	$1,902	$2,840	$3,273	$5,125	124	$3,026	$2,864	$5,245	$7,128	241	$2,450	$2,845	$4,362	$6,246
Other	398	$2,019	$2,843	$3,371	$5,518	477	$2,695	$2,566	$4,800	$7,181	887	$2,443	$2,687	$4,126	$6,393
Race															
Black	106	$3,363	$2,635	$1,547	$6,198	87	$3,286	$3,081	$4,712	$8,236	199	$1,314	$2,827	$4,226	$7,151
Hispanic	78	$3,166	$2,580	$3,778	$6,371	71	$3,201	$2,947	$5,165	$8,483	152	$3,200	$2,798	$4,403	$7,364
White	1,945	$1,823	$2,782	$4,117	$5,914	1,843	$2,529	$2,628	$5,555	$7,616	3,840	$2,209	$2,703	$4,931	$6,727
Other	148	$2,029	$2,484	$3,911	$5,642	125	$2,709	$2,672	$5,283	$7,431	278	$2,371	$2,579	$4,540	$6,449
TOTALS	2,288	$2,011	$2,760	$4,250	$5,928	2,140	$2,622	$2,657	$5,480	$7,665	4,494	$2,340	$2,708	$4,850	$6,755

*Include type of institution not reported.

SOURCE: Herbert J. Flamer, Dwight H. Horchard, and Susan Davis. Talented and Needy Graduate and Professional Students, 1982, Educational Testing Service: Princeton, New Jersey, p. 5.5.

TABLE 14 Application and Acceptance Rates of Blacks and Hispanics to U.S. Medical Schools, 1974-1984

1st-Year Class	Blacks					Mexican Americans					Mainland Puerto Ricans				
	Applicants N	Applicants % of Total	Acceptees N	Acceptees % of Total	% Accepted	Applicants N	Applicants % of Total	Acceptees N	Acceptees % of Total	% Accepted	Applicants N	Applicants % of Total	Acceptees N	Acceptees % of Total	% Accepted
1974-75	2,425	5.6	1,049	7.0	43.3	440	1.0	217	1.4	49.3	177	0.4	76	0.6	42.9
1975-76	2,288	5.4	945	6.2	41.3	427	1.0	220	1.4	51.5	202	0.5	86	0.5	42.6
1976-77	2,523	6.0	966	6.1	38.3	460	1.1	223	1.4	48.5	212	0.5	85	0.6	40.1
1977-78	2,487	6.1	966	6.0	38.8	487	1.2	227	1.4	46.6	203	0.5	93	0.6	45.8
1978-79	2,564	6.9	970	5.9	37.8	433	1.2	241	1.4	55.7	191	0.5	92	0.5	48.2
1979-80	2,599	7.2	1,024	6.1	39.4	457	1.3	267	1.6	58.4	173	0.5	92	0.5	53.2
1980-81	2,594	7.2	1,057	6.2	40.7	449	1.2	240	1.4	53.5	191	0.5	102	0.6	53.4
1981-82	2,644	7.2	1,037	6.0	40.0	515	1.4	281	1.6	54.6	222	0.6	113	0.6	50.9
1982-83	2,600	7.2	1,001	5.8	38.5	504	1.4	284	1.6	56.3	212	0.6	110	0.6	51.9
1983-84	2,558	7.3	1,019	5.9	39.8	507	1.4	263	1.5	51.9	214	0.6	117	0.7	54.7

NOTE: All minority groups include U.S. citizens. U.S. citizenship was redefined in 1981 to include students with permanent resident visas.

SOURCES: Dario O. Prieto and Paul Jolly. Data on Minority Medical School Students, Association of American Medical Colleges: Washington, D.C., 1984.

TABLE 15 Percentage Distributions of Characteristics of Graduate Record Examination (GRE) Test-Takers, by Race (U.S. Citizens Only)

	Blacks				Mexican Americans			
	1979-80 (N=12,046)	1980-81 (N=11,133)	1981-82 (N=9,556)	1982-83 (N=8,370)	1979-80 (N=2,178)	1980-81 (N=2,150)	1981-82 (N=1,983)	1982-83 (N=1,714)
Undergraduate Major								
Humanities	11[a]	11	11	10	13	11	13	13
Social Sciences	62	61	61	59	62	61	61	56
Biological Sciences	16	16	16	18	13	16	13	14
Physical Sciences	7	8	9	11	8	8	10	14
Others & Undecided	4	3	3	3	3	3	3	2
Aspiration for								
Ph.D. or beyond	37	38	38	37	32	38	33	32
Father's Education								
LT High School Grad	44	41	40	38	58	55	55	52
High School Grad	24	26	25	26	16	16	18	18
LT 4 yr College Grad	15	15	15	15	13	14	14	14
4 yr College Grad	6	5	6	6	4	5	4	6
LT Graduate Degree	2	3	3	3	2	1	2	2
Graduate or Professional Degree	9	10	10	12	7	7	7	8
Mother's Education								
LT High School Grad	33	30	30	28	55	54	54	51
High School Grad	28	28	27	26	24	25	24	25
LT 4 yr College Grad	20	21	21	22	12	12	14	14
4 Yr College Grad	7	7	7	7	4	4	3	4
LT Graduate Degree	4	4	4	4	1	2	1	1
Graduate or Professional Degree	9	10	10	12	3	4	4	4
Family Income During High School								
LT $6,500	35	31	28	25	34	30	29	27
$6,500 - $15,000	43	43	41	39	44	45	42	38
$15,000 -$25,000	16	19	20	23	16	18	21	23
GT $25,000	5	7	9	13	5	7	8	11

	Puerto Ricans				Whites			
	1979-80 (N=1,337)	1980-81 (N=1,282)	1981-82 (N=1,451)	1982-83 (N=1,359)	1979-80 (N=156,296)	1980-81 (N=148,513)	1981-82 (N=129,355)	1982-83 (N=117,686)
Undergraduate Major								
Humanities	15	15	13	11	17	17	16	16
Social Sciences	42	40	45	40	45	45	43	41
Biological Sciences	23	24	23	26	21	21	22	22
Physical Sciences	17	17	17	20	13	14	15	18
Others & Undecided	2	3	1	2	3	3	3	2
Aspiration for								
Ph.D. or beyond	26	26	26	26	26	26	27	27
Father's Education								
LT High School Grad	31	31	29	28	15	14	14	13
High School Grad	21	20	19	20	22	22	22	21
LT 4 yr College Grad	17	16	17	16	19	19	19	19
4 yr College Grad	10	11	13	13	16	16	16	16
LT Graduate Degree	3	3	3	3	5	5	5	5
Graduate or Professional Degree	19	19	19	20	23	24	24	25
Mother's Education								
LT High School Grad	36	34	32	31	11	10	9	9
High School Grad	22	20	21	20	34	33	33	32
LT 4 yr College Grad	16	19	19	20	26	27	27	27
4 yr College Grad	12	12	14	14	14	15	15	15
LT Graduate Degree	3	3	3	3	5	5	5	5
Graduate or Professional Degree	11	10	11	12	10	10	11	11
Family Income During High School								
LT $6,500	33	31	26	26	8	7	6	6
$6,500 -$15,000	43	42	42	41	34	31	27	24
$15,000-$25,000	16	19	21	23	34	35	35	34
GT $25,000	8	8	10	10	24	27	32	35

[a]Percentages are reported and rounded to the nearest whole and may not sum to 100.

SOURCE: Educational Testing Service, Princeton, New Jersey.

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